The Chinese Social Security System—Its Origin, Recent Reforms and the Prospect of Future Reforms

By

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A thesis submitted for the degree of Doctor of Philosophy of The Australian National University

To my parents

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Declaration

This thesis contains my own work except where otherwise indicated.

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Abstract

The Chinese social security system is subject to ongoing reforms. The fundamental reason for these reforms is that China is experiencing the transition from a command economy to a market-oriented one. The old social security system, which was biased towards urban people, was the outcome of the rapid-industrialisation development strategy adopted before 1978. It had significant disincentive impacts on individuals. Reforms during the 1980s and 1990s have attempted to link contributions to social security benefits, while providing a safety net for legal urban residents, but they are often the short-term responses to financial pressures on the old programs. Many of the reformed/new programs still have potential disincentive impacts on economic agents.

Using payroll tax to finance the pension scheme is not feasible for the coming population aging in China. The current, partially funded scheme, however, has a very high tax component, and does not appear to be financially viable. The best pension scheme for China is a fully funded scheme with individual accounts that are individually owned, fully portable, and earning market returns. The 'transition costs' of such a pension reform in China imposes only a minor tax burden on the economy. This is especially so when the government adopts the optimal taxation rule to spread the tax burden over a long period of time, and to collect more taxes when the taxation system becomes more efficient.

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Chapter 1. Introduction

This thesis is a study of the Chinese social security system. During its economic transition from a command economy to a market-oriented one, problems of the old social security system have emerged as increasingly important issues for both the Chinese government and individual economic agents. However, reforms in this area are complicated. At the background, the economic transition itself is extensive, dramatic and politically sensitive. Thus it is expected to take a long period of time, and is still far from having been completed. In addition, while the government attempts to establish a social security system that is in line with the market economy, China's old social security system built during the command economy is still in place, especially in cities. Given the complexity of the topic, this study focuses on two major goals. One of the goals is to provide a good understanding of the old social security system and its recent reforms. This provides a sound foundation for future research in this area, when the reform becomes deeper. The other goal is to explore one particular aspect of the social security system for future reforms—the possible impact of social security programs on economic efficiency. This is achieved by examining the efficiency aspects of individual programs. A careful study of this aspect is about the pension scheme[1].

This thesis covers the period between 1949, when the Chinese Communist Party (CCP) took over the power, and 2002. These 53 years are divided into two distinct sub-periods. The first one, referred to as the pre-reform period, is from 1949 to 1978. During this period, the Chinese economy was centrally planned, and the communist government pursued a rapid industrialisation development strategy. The second one, referred to as the post-reform, or the economic transition, period, is from 1979 onwards. During this period, the focus of the communist government's policy was shifted to establishing a market-oriented economy through economic reforms. This division of the whole periods is important, since the social security system has to be seen against the broader social and economic background, which was very different during the two sub-periods. This division also naturally divides the present study into three parts: first, the origin of the social security system in contemporary China (the pre-reform period); second, its

[1] The reason for choosing the pension scheme is briefly mentioned in the section 1.2, and will be discussed in more details in the introduction of Chapter 6.

reforms during the economic transition (the transition period) and third, the prospects of future reforms of the system (policy implications for further reforms).

1.1 The Definition of the Social Security System in This Study

In this study, the 'social security system' is used to refer both the formal government programs and to the informal arrangements that, in practice, provide support in cash or in kind to people in need. Specifically, the scope of this definition of the social security system includes the following categories:

(1) formal government programs that provide assistance to people in need, that is: those in poverty, the elderly and those suffering from unexpected or temporary misfortunes, such as illness or redundancy;
(2) informal arrangements that provide assistance for people in need;
(3) the provision of fringe benefits and welfare benefits for public sector employees.

Category (1) mainly refers to the programs specified by government regulations, such as the public pension program and the medial care program in the Labour Insurance Regulations (LIR). Category (2) of the informal arrangements is included because they play an important role in providing for people in need. The most important example of this category is that the rural collectives were supposed to provide the minimum living for all their members during the pre-reform period in China. The third category includes many types of arrangements for employees in the public sector in urban China by their employers. The most significant example was the provision of free housing.

Given this definition of social security, some provisions that are usually covered by the study of the Chinese social security system are not included; for example, benefits for veteran and their families are not covered. By this definition, free education is not included, although it can have a great impact on people's future welfare.

1.2 The Motivation for This Study

The modern social security systems in many developed economies that have been providing people with support during misfortune and old age are undergoing scrutiny for reforms. One of the major reasons is that many countries are experiencing demographic transitions of unprecedented magnitude, of which population aging is the most important (Peterson 1999). According to the United Nation's population projection (UN 2001), the old-age dependency ratio of the world population, that is, the ratio of the number of people aged 60 and over[2] to the number of working people aged between 15 and 59, will rise to 0.36[3] in 2050. This ratio was only 0.14 in 1950. Population aging is most evident in developed regions such as Europe. For the population in the more developed regions that include North America, Europe, Japan and Australia/New Zealand, the old-age dependency ratio is expected to reach 0.66 in 2050. This means that every three people of working age will have to support two elderly people. The economic implications of population aging are profound. It imposes financial pressure on the conventional public pension system in many of these developed countries. These pension systems often are financed on the pay-as-you-go (PAYGO) basis, where pension payments are financed out of payroll taxes and income taxes levied mainly on the employed. The medical care burden on taxpayers of an aging population can also be heavy.

The speed of population aging in most developing countries is not expected to be as dramatic as in the developed nations. The UN's (2001) projection shows that for population in less developed regions[4] as a whole, excluding China, the old-age dependency ratio, as defined previously, will be 0.28 in 2050, well below the world level. However, China, which has a larger population than any other country, is an exception among this group. The UN's (2001) projection shows that the old-age dependency ratio in China will reach 0.56 in 2050, although it is expected to be only 0.16 in 2005, which is very close to the world level. As Peterson (1999) points out, the

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[2] Often the elderly refers to people aged 65 and over. Here the age of 60 is chosen since the official retirement age for male workers in China is age 60.
[3] Figures here are calculated by the author based on the UN (2001). See Figure 6-3 in Chapter 6.
[4] Theses regions include all regions of Africa, Asia (except Japan), Latin America and the Caribbean plus Melanesia and Polynesia.

problem of population aging in China, a developing country, is as acute as that faced by most developed countries.

So the background of the Chinese social security reform includes (at least) the following features: 1) the dramatic demographic transition and the associated rapid population aging; 2) the economic and social transition from a command economy to a market one, and 3) the existence of an old social security system that was based on the command economy. Future policy designs should be explored with a good understanding of all these features. While there are lots of important issues to examine, this study intends to focus on the efficiency aspect of the social security system.

This efficiency aspect of the social security system is especially important during the economic transition. In the short run of the transition, many reforms are intertwined, and the government often conducts policy changes in response to imminent social, political and economic pressures. In the long run, however, the fundamental issue of efficiency must be considered in designing all social security programs, if the Chinese government is to realize the potential benefits of a market economy. The efficiency aspects need to be examined in the context of a particular social security program. In this study, more space is devoted to the old age pension scheme than any other single program, since this is the one of the largest program in terms of expenses, and the one that has experienced the most dramatic reforms during the past two decades.

In summary, this thesis provides: (1) a relatively comprehensive, up to date (2002) study of the social security system in China under the communist government; and (2) an analysis of the economic efficiency aspect of pension reforms to provide explicit policy implications for further reforms of the pension system.

1.3 The Structure of This Study

Perhaps the most distinct feature of the old Chinese social security system is that it was composed of two very different, yet closely related sub-systems. One was primitive and was applied in rural areas, and the other one was very generous and covered city residents. Obviously, in order to maintain this dual social security system, effective institutional restrictions on labour mobility were essential. The reviews of the old social

security system in Chapters 2 and 3 include some discussions of these restrictions. From the point of view of market mechanism of resource allocation, both the segregation of the social security system and these institutional restrictions on economic decisions (especially on labour mobility) can cause huge efficiency losses and therefore are difficult to understand. However, the social security system is a part of the whole social and economic institutions of a country. It integrates with other institutions in one-way or another. How much provisions are provided for people in need reflects the society's values; how these provisions are financed often illustrates the economic mechanism of the society. In the case of the Chinese social security system, this dual social security system was an unavoidable consequence of the government's development strategy during the command era[5].

First and foremost, the Chinese social security system was established while the communist government (the central planner) decided to modernise China by promoting rapid industrialisation of an economy that was dominated by agriculture. This strategy was the outcome of the historical domestic and international circumstances. These included the humiliations inflicted on China by foreign powers, the West and Japan, but especially Chinese experiences during the early 1950s of the Korean War. On the one hand, at the end of the 1940s and early 1950s, immediately after the communist takeover, China was underdeveloped and over 80 per cent of population lived in rural areas. In 1949, nearly 60% of GDP was contributed by the agriculture sector, 29% by the industrial sector and 12 % by the commercial sector (Zhang 1994: 2). On the other hand, at the time, the conflict between capitalism and socialism was so intense that most western countries refused to recognise China's communist government. The Korean War in the early 1950s led to an economic blockade of China by these western countries.

Given the communist party's dislike and distrust of Western capitalist economics, it is not surprising that the Chinese government followed the Russian style of modernisation, by increasing investments in industry, especially in large-scale, capital-intensive heavy industries. Moreover, Russia was the only country, at the time, that China could obtain some initial capital to start its modernisation (Wen 2000). To have enough savings for

[5] Lin, Cai and Li (2003) has an excellent analysis of the background of the development strategy and the consequent economic institutions during this period.

investments in industries, the communist party had to channel resources from the relatively large sector of the economy, the agricultural sector, to the industrial sector. For the reasons just mentioned, this was not done by explicit taxes and subsidies, but by off-budget state planning using directives that cross-subsidised industry at the expense of agriculture. Compared with explicit taxes, this approach of using 'implicit taxes' also had the advantage of reducing resentment of farmers (Yang and Zhou 2000; Liu 1999).

To speed up industrialisation, workers obviously had to be attracted from rural to urban areas. This was done partly by paying relatively attractive urban wages, and partly by providing employees in the public sector in cities with relatively generous non-wage benefits, such as houses, pensions, health insurance and all the other cash or in-kind benefits that will be discussed in this study. Indeed, during the 1950s, the social welfare benefits to employees in the state-owned-enterprises (SOEs) and other public organisations were so generous that Prime Minister Zhou Enlai commented in 1957 that the system had gone too far ahead of the economic and social status of the country at the time, and the government had built 'too many' social welfare facilities (Shao and Chen 1991: 53).

The generous social security system for SOE workers in urban China attracted a large number of farmers into cities in the early 1950s (Shao and Chen 1991). During the first year of the Great Leap Forward, 1958, the number of urban employees increased by 67.5% compared with the previous year. This was partly the result of relaxed employment policies and partly due to the generous social welfare benefits for urban workers (Yang and Zhou 2000). To curb further rural migrants to cities, the government adopted the Household Registration System (HRS) in 1958. Combined with other policies[6], the HRS effectively restricted rural to urban migrants during the pre-reform period.

Of course, to promote rapid industrialisation, the communist government could have forced the agricultural sector to cross-subsidise industrialization without giving urban workers such generous overall treatment (in terms of wages and non-wage social security and housing benefits) that it had to restrict the flow of migrants to urban areas. It could have just given urban workers the minimum package of wages and other

benefits that were needed to induce the labour movement required to operate the factories of the SOEs that the government was building. So why did the Chinese government give urban workers a much better overall deal than the minimum needed to provide an industrial labour force?

One possible answer to this question is that the communist party needed the full support of the people before it took over power in 1949. In rural areas, it gained the support of farmers by distributing land owned by the landlord to every farmer. In factories at the areas it had taken over, the CCP provided generous social welfare benefits to all workers (Shao and Chen 1991). These social welfare provisions formed the basis of the national scheme for workers—the LIR, which was drafted in 1950. The draft was then open for all urban employees to comment on before it was formally issued in 1951. The main regulations remained almost unchanged during the pre-reform period, except for the extension of the coverage of the scheme in 1953. As one could imagine, once the workers had enjoyed the generosity of the government's social security benefits, it was very difficult to reduce the provision of benefits without causing resentment or even a threat to the stability of the government from the workers. In general, unlike individual rural households who are relatively independent of each other, when workers are brought together in factories and cities, they inevitably obtain industrial power whether unions are legal or not. To avoid the kind of miscalculation by the communist party like those occurred in Europe—Polish urban workers brought down communism, the Chinese communist government had to continue the generous social welfare provisions that had helped it to gain support from workers before 1949. It therefore offered the Chinese urban workers a relatively good deal—at least relative to Chinese rural workers. This is why the comments made by Zhou Enlai in 1957 did not actually lead to any reduction of the social security benefits of urban workers in China. Selden and You (1997) comment that:

'For ideological reasons, but also in order to secure an urban political base and to transfer the rural surplus to urban industry, China's leaders prioritised the welfare of industrial workers over farmers' (1997: 1666).

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[6] These policies are discussed in Chapter 2.

In this relatively good deal offered by the government to urban workers, part was given in the form of the non-wage social security and housing benefits. The study of these arrangements is an important part of the present study. The reason for the choice of non-wage benefits was that the communist government wanted to maximise investments in the industrial sector by minimising consumption. High wages paid to workers would have induced demand for consumption goods and services. During the pre-reform period, the pursuit of rapid industrialisation had led to the rationing of most consumption goods in China, from basic food to general household utensils. Paying workers by direct benefits in kind was simply part of this rationing system. This also explains why the welfare benefits of urban workers covered a wide-range of necessary services for households, such as housing and childcare.

Given the fact that Chinese urban workers received a relatively attractive combination of pay and fringe benefits during the pre-reform period compared with farmers, it was efficient for the central planner to restrict labour migration to cities. As demonstrated by the two-sector migration model by Harris and Todaro (Todaro 1969; Harris and Todaro 1970; Todaro 1989), an institutionally determined wage in cities that is higher than the market level attracts rural migrants to cities. Since farmers make their decision to move to cities by comparing the expected lifetime income in cities versus that in villages, the wage gap between rural and urban areas tend to attract too many rural migrants and cause substantial and prolonged urban unemployment. Unemployment wastes resources that would otherwise being used to produce more agricultural products. As a result, direct control of the movement of farmers to cities can reduce urban unemployment. Such controls can achieve a higher level of agricultural output for the same level of industrial output.

In the case of China, the gap between the labour remunerations of a worker in a publicly owned factor and a farmer in a village was significant, as this study will show in Chapters 2 and 3. Therefore, there was a strong incentive for Chinese farmers to move to cities. To curb potential urban unemployment and the associated social and political problems such as crime, the government needed to control rural migration. Moreover, the government's development strategy of using the agricultural sector to cross-subsidise the industrial sector meant that it was optimal to maximise agricultural output, so long as there were enough workers in cities. Under the command economy, a higher

agricultural output provided more subsidies to the industrial sector. In other words, so long as the marginal product of rural labor force was positive, it was always efficient for the government to have as many farmers engaged in agricultural production as possible. As will be discussed in Chapters 2 and 3, the communist government therefore adopted a series of policies to curb migration of farmers. These policies included collectivisation of farmers, the HRS and other restrictions on domestic travel. The government also issued directive that forcibly 'sent down' urban residents to villages at times when there was large-scale implicit unemployment in cities.

During the pre-reform period, the Chinese population suffered two tragic events. Both tragedies were caused by economic as well as political factors. The first one was the Great Famine from 1959 to 1961, during which millions of people, mainly in villages, died of hunger and malnutrition[7]. It was partly the result of policy mistakes and failures—notably the extreme policies used to promote rapid modernisation and partly the gross demonstrated failure of the social security system to deal with the famine (Ashton 1984; Dreze 1989). The second tragedy was Cultural Revolution (1966-1976). During this period, among other events, millions of urban school graduates were sent down to villages, as part of the government's policy to cope with the unemployment problem in cities. The causes and consequences of these two tragedies are surely valuable and interesting issues for research[8], but the present study focuses on more recent policies: the analysis of the social security system in rural China will focus on the situation after the Great Famine, while that in cities will mainly examine policies at the end of the 1970s.

While the origin of the Chinese social security system must be seen against the background of the communist government's development strategy during the pre-reform period, that is, taxing the agriculture sector to cross-subsidise the industrial sector, the reform of this system should also be seen against the background of the economic transition towards a market-oriented resource allocation mechanism. Firstly, the economic transition had led to the abolition of the off-budget subsidy from the agricultural to the industrial sector. The transition from a command economy towards a market economy has also significantly reduced the central government's capacity of

[7] More discussions of the Great Famine can be found in Chapter 2.

mobilising resources in the economy (Wang and Hu 2001). This has surely contributed to the increasing difficulty of financing social security benefits at the level that urban workers had enjoyed during the pre-1978 era. Discussions in Chapter 4 will show that budgetary pressure appeared to be the direct causes for most reforms of the social security system in cities. Most reforms also have aimed at financing various schemes by employer and employee contributions, rather than relying on government budgetary revenues.

Secondly, it is easier to understand why the recent social security reforms have mainly occurred in cities in the context of economic transition. The transition had destroyed the institutional foundation of the rural social security system in a dramatic fashion[9]. In the meantime, the rural-urban segregation inherited from the command era has not been eliminated. This has allowed reforms to be carried out in cities only. The huge gap of social security benefits between the rural and the urban system have also contributed to the urban-focused social security reform. In this study, the review of recent social security reforms (Chapters 4 and 5) looks at those occurred in cities.

The rural social security system was very primitive and focused on the provision of a minimum subsistence to all farmers. During the early 1980s, the government abandoned the development strategy of taxing the agricultural sector to subsidise the industrial sector, and gave individual rural households access to land and freedom to market their produce. These reforms improved the welfare of farmers significantly[10]. There was no immediate pressure on the government from farmers to provide the kind of formal social security protections that exist in cities and it has been argued that, in effect, the provision of land by the government to farmers is the rural equivalence of the urban social security arrangements (Wen 2000).

The old urban social security system, however, was very generous and included wide-range of benefits. When real wages of urban workers, especially those in SOEs, increased quickly (see Figure 4-4) during economic transition, this contributed to the

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[8] For some recent research of this issue, see papers in the Special Issue: China's Great Famine in *China Economic Review*, Volume 9, No. 2, 1998.

[9] For studies of the rural reform in China, see, for example, Powell (1992), Chen (1998), Huang (1998), Chen, Deng (et al.) (eds.) (1992), Lin, Cai and Li (2003),

[10] These reforms also destroyed the foundation of the rural social welfare system—the rural collective system. Instead, land became the 'social security' provided by the government to rural residents.

rapidly rising financial costs of social security programs. In the meantime, the government's capacity to mobilise resources was declining (Wang and Hu 2001). The financial pressure, as well as the uncertainty brought by the market mechanism that threatened social stability in cities[11], was the main driving force for social security reforms in urban areas. In addition, urban social security reform became necessary after other reforms in cities, especially those of SOE and of labour market, started (see Chapter 4). As mentioned previously, the demographic transition and population aging also generated pressure for social security reforms. Selden and You's (1997) comment about the urban old-age pension program in China is a good summary of the pressure for reform of the urban social security system:

'But this "advanced" system of costly pensions for a small minority of the labour force could not be sustained on the foundations of China's economy, nor could it adequately serve the interest of the broader working classes in longer range perspective' (1997:1665)

Thirdly, social security reforms during the post 1978 period must be seen as part of the on-going transition of the Chinese economy. They were often made inevitable by other reforms, and their success often depended upon the implementation of complementary reforms in other areas. For instance, pension reform was regarded as partly a consequence of SOE reform (Zhao and Xu 2002). However, the success of the current pension reform also depends on the implementation of changes in areas such as financial market and the fiscal system (Xu 1999; Li 1998; Zhou and Wand 1996). Such interconnections during economic transition have had important consequences: potentially good policies have sometimes been unsuccessful because the government often implemented piecemeal reforms that focused only on the short-term financial, social or political pressure. As a result, reforms were often incomplete and further reforms are needed. The pension reform is a good example. As this study will show, a series of pension reforms occurred between the mid-1980s and the late-1990s, as responses to imminent financial pressure on the old PAYGO scheme. However, they were more of a pragmatic approach than a systematic approach to the fundamental problem of the old scheme. The most recent reforms in the late 1990s did attempt to

[11] These include open unemployment in cities and urban poverty. The former is discussed in Chapter 4 and the latter in Chapter 5.

establish a funded scheme; however, as the analysis in Chapters 6 and 7 will show, there are still lots of scope for further reforms of the pension system.

Finally, due to the limited space of the thesis, this study does not examine some of the important issues of the social security reform in China. For example, issues of rural social security system after the collapse of the old system in the 1980s are not discussed. There has been little progress in expanding the coverage of the urban social security system to include farmers. This is due to the great difficulties in the financial and institutional areas (Zhang, Ding et al. 2000). With the abolishment of old policies that restricted factor mobility within the country (as well as across the border), labour has become more mobile in China: not only from cities to cities, but also from villages to cities. This has generated challenges for the social security system, for example, whether and how should the urban system provide a social safety net for rural migrants? This study touches upon this issue in reviewing the new social relief program in cities—the Urban Minimum Living Security (UMLS) program (Chapter 5). It is briefly examined from the viewpoint of possible implications on economic efficiency when the UMLS program covers only urban residents. Much more studies are needed in this area, when the domestic labour market is more integrated and the distinction of rural and urban residents is abolished.

In this study, the term 'urban residents' generally refers to people who live in cities and have urban household registration, while 'rural residents' refers to people who have rural registration, no matter where they live.

This background of economic transition indicates that the social security reform in China is a complex area, and thus much more research is needed in order to understand all relevant issues. This study only focuses on the possible impact on economic efficiency of social security programs. The reviews of the pre-reform social security system and its recent reforms are important parts of the study, in order to understand the current and possible future challenges and policy options. The old-age pension scheme is used in this study as an example to examine the advantages and disadvantages of various approaches of financing the scheme. This approach—examining individual programs instead of the whole system—is considered as necessary, since the efficiency impacts of a social security program depends on its specific rules. It is expected that the

insights learned from studying of this particular program will help understanding issues in reforming other social security programs, both in China and in other economies.

This study is divided into 8 chapters. The next two chapters review the origin of the Chinese social security system during the pre-reform period. Since the rural and urban sectors had parallel yet significantly different systems, the review looks at rural and urban systems separately. Chapters 4 and 5 review recent reforms of the social security system, which have occurred mainly in cities. Chapter 4 looks at the major reforms of the employment-based programs, while Chapter 5 examines the new social relief program in cities as part of the government's response to all urban poor. The focus of Chapters 6 and 7 is the pension reform. Chapter 6 discusses population aging and the economic transition factors in China, and incorporates them into an optimal taxation model. Based on UN's (2001) population projection, the deadweight losses of financing the public liabilities of the old, PAYGO pension scheme in each period are estimated, and are compared with those following the optimal intertemporal taxation path. This exercise indicates that the old PAYGO pension scheme is not feasible and reforms are needed. Chapter 7 then looks at the taxation impact on individual workers of an alternative pension scheme—a fully funded scheme, and comments on Chinese pension reforms in the 1980s and 1990s. Chapter 8 concludes the study with some policy implications for further reforms of the Chinese social security system, especially of the public pension scheme.

Chapter 2. A Review of the Rural Social Security Programs In Rural China during the Pre-reform Period (1949-1978)

2.1 Introduction

This chapter reviews the social security system in rural China during the pre-reform period. This period extends from 1949, when the Chinese Communist Party (CCP) took over power, to when economic reform was officially launched in 1978. The review provides a brief study of the origins of the rural social security system in China. The very different urban system will be reviewed in the next chapter. Given the general data limitations for Chinese studies, and for the pre-reform period in particular, this chapter is based mainly on the literature of Chinese studies and some figures that are available from Chinese official sources (such as statistical yearbooks).

During this period, in order to control the agricultural sector as part of a centrally planned economy, farmers were organized into collectives—the People's Communes. A typical People's Commune was composed of a few production brigades, which were divided into production teams. Geographically, production brigades were based on natural villages, while production teams were based on rural neighbourhood households. Land and agricultural production tools were initially owned by the commune but later by production teams.

This People's Commune system integrated government administration and economic management. From the economic management point of view, each team organized agricultural production according to the government economic plan. It had to pay agricultural tax and to sell as much as possible of the yield to the state at prices set by the government. As for the role of government administration, an important part of the Commune's function was to look after its members, including the provision of a minimum living for all, and other social welfare facilities such as the basic medical care.

There was a three-tiered safety net in rural China, based upon the family, the Commune (collective) and the state government, where the role of the People's Commune was

essential. All team members had access to land owned by the team, which provided the basic source of living in the countryside. Individuals were expected to work on the land. If an individual could not work the land to earn a living, firstly other family members were supposed to support him/her. As a result, families took care of the young, the elderly, the sick and the disabled. The collective's role in social security, particularly the production team, was to assist poor families, and those in need but with no family support. In this regard, the production team provided risk sharing among the local community. Government assistance came only when the collective could not cope, such as following a natural disaster.

Figure 2-1 shows the administrative and management structure of the rural society as well as the channels through which social security services were delivered. The solid line represents the administrative relationship from the top to the bottom. Note that the People's Commune was the lowest level of government at the time. The dashed lines represent the channels where social security services were delivered. The squares represent relevant agents, while the ovals show economic plans or welfare assistance delivered. While some social security services were delivered by the production brigade, many security services were delivered by the production team. Few of the social welfare services available from the state government were delivered by the Ministry of Civil Affairs (MCA)[1]. The MCA issued financial and/or material assistance through its local agencies to the People's Commune, which then delivered services to rural households.

The role of the collective, that is, the production team, the brigade as well as the People's Commune, in this rural social welfare system was embodied in its income distribution process. In particular, the production team was the key social welfare provider for its members during the pre-reform period. The team had the responsibility to provide a kind of minimum living for all members. This was done through its income distribution among team members. It also contributed welfare funds to the brigade and the Commune, to finance other social welfare functions, such as the five-guarantee

[1] The MCA was established in 1978 to take over the functions of the Ministry of Interior (MOI), which was disbanded in 1970 during the Cultural Revolution (1966-1976), when its functions were transferred to several other government organizations (Zhang 1989).

program[2] and the basic health care. This contribution was made during the process of dividing income between the team and the members, which was prior to the income distribution among team members. This chapter will discuss the structure of the People's Commune and its income distribution process in details.

The above description shows that the social safety net in rural China was an elementary system, mainly based on traditional family values and the community mutual support, which was in the form of the rural collectives. This is supported by Ahmad and Hussain (1991), Selden and You (1997), etc. Such a social safety net had very limited risk sharing within the local collectives. At times when a major catastrophe occurred that required risk sharing among a larger population, such as at the provincial or regional level of the economy, the effectiveness of this collective safety net provision was dependant upon the communication from the production team to the brigade, the People's Commune, and then the higher levels of government. However, conflict interests of the different levels of government reduced the effectiveness of the system[3].

This chapter is divided into four sections. The next section discusses the economic and social background of the rural social security system during the pre-reform period, particularly the People's Commune system. Section three looks at the safety net provided by the collectives, especially production brigades and teams, and the government. Section four summarizes the chapter and points out its connection to subsequent chapters of the thesis.

2.2 Economic and Social Background and the People's Commune System

Over 80 per cent of the Chinese population lived in the countryside during the pre-reform period. In this respect, China was an agricultural economy and social welfare services for farmers were an important part of the entire social welfare system. Between 1949 and 1978, the institutional setting in rural China changed dramatically. Land was evenly distributed to rural households in the early 50s, soon after the CCP took over power. The People's Commune system was consolidated in the early 1960s through a

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[2] This program provided the basic food and clothes, etc to the elderly and other team members who had no families. More details are discussed later in the chapter.

[3] The failure to respond adequately to the Great Famine of 1959-1961 provides the most terrible example of these inefficiencies. See discussions later in this chapter. However, the social security system discussed in this chapter was mainly established after the Great Famine.

series of collectivisation policies, and remained the key organization in villages until the commencement of economic reform in 1978. The background study in this section focuses on the People's Commune system, in particular, the income distribution between the Commune and the government as well as within the Commune.

2.2.1 Formation and Structure of the People's Commune

After the establishment of the People's Republic of China in 1949, radical land reforms were conducted to ensure all farmers had their own land. This was done by redistributing to each rural household, particularly to landless poor peasants, land previously concentrated in the hands of landlords and rich peasants (Marsh 1985). This land reform was completed by the end of 1953.

Several problems remained unsolved following this land reform. For example, in some regions, the land-population ratio was so low that some households could not produce a marketable surplus on their land. The redistribution of capital goods, mainly tools, animals and farm equipment, was not parallel with the land redistribution. Also, small-scale family-based farming could not provide the extensive rural capital constructions needed, such as water-control (Marsh 1985).

Several other economic and political considerations contributed to the government's decision to promote the collectivisation of agriculture (Guo 1993; Wen 1994; Wen 2000). The socialist ideology against possible polarization due to privately owned land was one. In addition, with the Western countries' economic blockade of China following the Korean War in the early 1950s, the industrialization priority strategy required the agricultural sector to be a net contributor to the economy of cheap food, raw production materials, and perhaps capital[4]. It was obviously easier to fulfil this assigned role for agriculture by controlling a relatively small number of organizations rather than millions of individual rural households. Another concern was to prevent the kind of large-scale migration from rural to urban areas, which could create unemployment and urban crime.[5]

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[4] Wen (2000) has an interesting analysis of the collectivisation policy in rural China and the central government's plan of rapid industrialization at the early 1950s.

It took the government nine years (from 1953 to 1962) to establish and consolidate the organizations of the rural collective—the People's Commune system (see Table 2-1). During the early stage (up until 1957), the process of collectivisations in China went relatively smoothly (Hudson 1960; Parish and Whyte 1978). Most regions experienced several stages from household farming to collective farming before the establishment and consolidation of the People's Commune. The first stage was called the 'mutual-aid group'. Individual rural households formed small groups where they could help each other with agricultural production. Since the ownership of land and tools was still with households, labour or other forms of assistance required remuneration. The second stage was the 'lower-stage agricultural producers' cooperatives'. While the ownership of land and other production tools did not change, the cooperatives organized major agricultural activities. Income distribution was based on labour, land and other inputs contributed by households. The third stage was the 'higher-stage agricultural producers' cooperatives'. At this stage, land and other major production resources owned by rural households were handed over to the cooperatives. The income of members was solely determined by their labour contributions (Huang 1976; Parish and Whyte 1978; Marsh 1985; Liu 1994).

During the political campaign called the Great Leap Forward, which commenced in 1957, the government adopted radical policies to eliminate private ownership and promote the formation of People's Communes in the countryside. The size of the People's Commune became very large, incorporating tens of thousands of people. Not only land and major production tools, but previously privately owned small plots, domestic animals and small production tools were all communised. Mass halls were established to provide free meals to every member of the Commune. Nurseries, schools and medical services were provided free of charge to commune members. These measures of leaping forward towards communalist villages were not sustainable, and in the Great Famine that followed, between 1959-1961[6], perhaps as many as 30 million people died[7], as a result of a combination of policy mistakes and natural disasters (Ashton, Hill et al. 1984).

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[5] The next chapter discusses in detail the reasons why the government adopted policies to curb migration, especially of rural-urban migrants.

[6] For some discussions about the causes and consequences of the Great Famine, see section 2.3.2.1.

[7] There are disputes about the scale of premature death during the Great Famine. Examples of the studies are Ashton and Hill (et al) (1984), Peng (1987), Dreze and Sen (1989).

After the famine, the basic structure of the People's Commune was consolidated in 1962. These consolidated People's Communes organized farmers according to natural geographic locations. The size of the Commune was reduced. The ownership of land and major production tools was lowered to the production team, which was the basic unit of the Commune. The production team was based on the neighbourhood community within villages. Several production teams were formed into a production brigade, which was usually equivalent to a natural village. A number of production brigades were then formed into a People's Commune, which usually corresponded to the previous township. The number of people in the three levels of rural organization varied from region to region. In 1965, on average, there were 109 people in each production team; 8.3 teams in each production brigade and 8.7 brigades in each People's Commune. Overall, there were about 75 thousand Communes in rural China (SSB 1981). Table 2-1 shows the procedure of the establishment and consolidation of the People's Commune system during this period.

In the consolidated People's Commune system, the production team owned the land and most other production materials. It was also the basic accounting unit of the Commune. It organized agricultural production according to the government economic plan and was responsible for income distribution amongst commune/team members. The production brigade was responsible for coordination of production teams in terms of the production plan, etc. The brigade also owned small industries and other sideline production[8] in villages, such as mills, orchards and pig farms. The Commune had some functions of government administration, such as ensuring the economic plan was carried out (Wen 2000), running upper middle schools and hospitals, and undertaking irrigation projects, etc. The Commune town was also the seat for special co-operatives for artisans such as barbers and other services. Employees of the Commune government received a salary and a monthly allotment of grain from the government. The top leaders of the commune were usually appointed by the higher level of the government. In this way, the government maintained its economic and political control over communes (Parish and Whyte 1978).

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[8] In China, this referred to productions as opposed to the main agricultural production in the local area. Traditionally, the sideline production included rural productions other than the culture of field crops (Editorial Board of The Great Encyclopaedia of China 1990).

The consolidated People's Commune was based on the natural geographical distribution of farmers in rural China, where historical connections between neighbours were strong. As a result of this system, the government economic plan could be carried out while the financial cost to the government of establishing and running the system was low. In addition, the People's Commune system provided the institutional foundation for the rural social welfare system at the time, particularly through its income distribution process.

2.2.2 The People's Commune and the Government—Division of the Harvest between the Commune and the Government

During the era of the centrally planned economy, the welfare of the farmers in China was largely determined by government policies, especially those that determined the division of the harvest between the People's Commune and the state. Within the distribution of the agricultural harvest, the division of grain was the most important issue, since grain was regarded as the principle of agricultural production. As a result, grain production dominated agricultural production during most of the period (Zhang 1994; Wen 2000). The following discussion of the division of harvest will focus on gain. Grain will be used in kind unless otherwise stated.

The total grain harvest of the production team was divided into two categories. The first category included grain to meet the team's essential expenses. This included an agricultural tax to be paid to the state and 'three retained funds' for the team's production. The 'three retained funds' were the team's share of grain, for seed, fodder and team members' grain rations[9]. The second category was the rest of the yield and was considered 'surplus grain' (*yuliang*) by the government (Oi 1989). The government obtained the 'surplus grain' by a state monopoly of grain purchase and marketing system established in 1953 (Wen 2000). The agricultural tax will now be discussed followed by the state monopoly of grain purchase and marketing system.

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[9] During the pre-reform period, China adopted ration system to distribute most of consumer goods, especially food. See more discussions about this in the next chapter.

2.2.2.1 The Agricultural Tax

The People's Commune system was the organization that maintained the state monopoly over grain purchasing and marketing system. It was also responsible for collecting the agricultural tax. Instead of dealing with several hundred million individual farmers, the government needed only to control about 75 thousand Communes (as in 1965). As the lowest level of the government in rural areas, the Commune collected the agricultural tax and supervised implementation of the state monopoly of grain purchase and marketing.

The agricultural tax was usually paid in kind as grain. The Commune determined the amount of tax on the basis of 'three criteria' (*san ding*), namely, the average yield per *mu*[10], land quality, and the amount of arable land owned by the production team. The average yield was estimated according to the actual past output, usually the average yield during the previous three years. The quality of land was evaluated as good, average or poor, each attracting a different tax rate (Oi 1989:19; Wen 2000). As the basic unit of accounting and agricultural production, the production team paid the tax and was responsible for the quality and timely delivery of tax grain to the official grain station located in the commune town.

In practice, the agricultural tax was expressed as a fixed amount of grain per *mu*, rather than as a percentage of output (Oi 1989). In the official statistics, the agricultural tax was listed as the actual amount of flour and rice (Lou 2000). Table 2-2 shows that agricultural tax as a percentage of total grain yield declined during the pre-reform period. Oi (1989) also finds the same result in a case study of Minhou county, Fujian province. The tax as a percentage of total grain output was 14.4 percent in 1952. The rate dropped to 5.5 and 4.3 percent in 1965 and 1979, respectively.

When actual grain yield was higher than estimated output, the amount of agricultural tax did not change. When actual yield was lower than the estimation, the production team usually still had to pay the fixed amount of tax. Teams with a very poor yield might get a tax remission and receive state relief. However, this could be difficult and

[10] The unit of land area in China, 1 *mu*= 0.67 hectare.

was usually only possible when major disasters occurred (Oi 1989). Government relief for natural disasters will be discussed further later in this chapter.

2.2.2.2 The State Monopoly of Grain Purchasing and Marketing

In addition to the agricultural tax, the state obtained grain from farmers through the state monopoly of grain purchasing and marketing system. This system was set up in 1953 and guaranteed the state as the sole buyer and seller of grain in China[11]. Evidently, the People's Commune system facilitated this state monopoly. Under this system, there was a state granary responsible for buying and selling grain in each commune. The government took measures to ensure that production teams to sell their entire surplus to the state granary at prices fixed by the sate.

Text Box 2.1 The Grain Rating System that was Associated with the State Monopoly of Grain Purchasing and Marketing

Roughly speaking, the grain rating system for production teams of the Peoples' Commune can be summarized as follows:

Denote the average grain available to each team member per month as Q, which was calculated according to the following formula,

$$Q = (Y_e - T - S\&F)/(N*12)$$

Where Y_e was the estimated output of the team per annum, calculated in the same way as for the agricultural tax. T was the agricultural tax. S&F represented the amount of grain necessary for seed and fodder. N was the population of the team.

This average grain (Q) was then compared with the minimum level of average grain per capita set by the government called the 'safety level' (denoted as Q_s). Q_s was usually between fifteen and seventeen kilograms of unhusked grain per person per month. If Q was above Qs, the team would be rated as grain-surplus; if Q was only around thirteen kilograms, the team would be rated as grain-deficit; if Q was in between thirteen and fifteen kilograms, the team would be rated as grain-sufficient (Oi 1989). Table 2-3 summarizes the above information.

Once a production team was rated, the government decided the procurement quota based on the surplus grain for grain-surplus teams, the potential grain supply available for resale to grain-deficit teams (*fan xiao liang*), both as part of the so-called 'three-fix' scheme that also included the officially determined estimated output (Q_e)(Carter and Zhong 1988:39). Grain-sufficient teams did not have to sell any grain to the state, but they were not eligible for the state grain resale, either. The three figures, Q_e, the procurement quota and the grain for resale were initially fixed for three years, but were later changed to five years. However, unless a serious disaster occurred that resulted in a much lower actual output, the state procurement quota had to be met one way or the other (Oi 1989).

[11] The state monopoly of purchasing and marketing included other major agriculture products as well, such as cotton, rapeseeds, etc.

Firstly, the government decided which production teams should sell grain to the state by categorizing them into three groups: 'grain-surplus', 'grain-deficit' and 'grain-sufficient' (Oi 1989). The rating was based on the average grain available to each team member per month (see Text Box 2.1). Teams rated as grain-surplus had to sell to the government according to the procurement quota, at prices fixed by the state. Teams rated as grain-deficit had to rely on the resale of grain from the government through this system, at prices grain was sold to urban residents[12] (Walker 1984). These teams usually used income from other sideline productions, such as pig farm, to pay for the resale grain.

Secondly, the government established quotas to obtain as much grain as it could from the production teams. Since the procurement quota was fixed for a few years, it might not reflect all the 'surplus grain' when actual output increased during the period. In order to obtain the maximum surplus grain possible, in addition to the initial compulsory procurement quota, called 'fixed quota purchases (*dinggou*)', the government introduced the other category of procurement quota, called the 'above quota purchases (*chaogou*)' in the 1950s. Later on, the 'negotiated purchase' was also introduced and price incentive was used to encourage grain sale to the state (Maxwell and Nolan 1980; Cheng and Tsang 1994). In practice, production teams were under constant political pressure to sell more than the fixed quota, and the 'above quota purchases' was often pre-determined by the local government. In principle, the 'above quota purchase' was not 'compulsory', but 'obligatory', in the sense that there was no penalty for not meeting the requirement. The government paid the same price for grain in this category as that in the fixed quota purchase until the early 1970s (Maxwell and Nolan 1980; Cater and Zhong 1988). A premium was added to the price paid to this type of procurement since the early 1970s (Carter and Zhong 1988). The 'negotiated purchase' referred to voluntary sales to the government that was in addition to the 'above quota purchase'. The price was negotiated between the two parties (Maxwell and Nolan 1980).

Overall, during the late 1970s, there were four categories for state grain procurement: (1) the agricultural tax, obtained in kind; (2) the 'fixed quota purchases' (or the

[12] The sales price of grain to urban residents was higher than that of the procurement prices from the farmers.

procurement quota), obtained at the fixed state price; (3) the 'above-quota purchase', obtained at a premium price 20-30 percent higher than the fixed state price; and (4) the 'negotiated purchases', obtained at a premium price 30-50 percent higher than the fixed state price, plus the opportunity to buy rationed goods. Table 2-4 lists these types of procurement. Columns 5 and 6 in Table 2-5 show the amount of state grain procurement[13], and as a percentage of total output up to 1962. These figures provide some indications as to the scale of the state share of grain during that period.

Figure 2-2 summarizes the division of the harvest between the state and the production team. The harvest was divided into the state share and the collective share. The sate share included the agricultural tax, the fixed quota purchase, the above-quota purchase and the negotiated purchase, while the collective share was composed of grain for team members' quota, the draught animals and the seed for the coming year.

While the production team received payments for its grain sales, the amount of revenues depended upon the state determined prices, under the state monopoly of grain purchasing and marketing. If the prices were relatively low compared with other goods and the team had to sell the grain to the state, the real income of the team and its members would be lower than otherwise. Studies show that the government set low grain prices relative to industrial products. Through these low relative prices and a purchasing monopoly, the Chinese government obtained large amount of surplus from the agricultural sector for its industrialization (Oi 1989; Wen 2000; Guo 1993), leaving the production teams little to distribute amongst members.

2.2.3 The People's Commune and the Farmers—Division of Harvest within the Commune

Following the division of the harvest between the production team and the government, the income distribution within the Commune was carried out at the production team level. Examining this distribution process—between the team and its members as well as among team members—reflects the critical role of the Commune in the rural social welfare system.

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[13] The procurement figures are net of grain resale to farmers.

2.2.3.1 Income Distribution between the Production Team and its Members

As illustrated in Figure 2-2, among the share of the grain harvest that belonged to the collective (mainly at the team level), it was divided into the fodder, the seed and the team members' ration[14].

As for the cash revenue[15] of the team, the amount of withholdings by the team was often decided at team members' meeting. The leftover cash was then available to distribute among members.

The cash withholdings were made for the purposes of production and public welfare. The former included reserves for capital accumulation, such as future purchases of draught animals and farm machinery, etc. The latter included withholdings called the 'public welfare funds', which was mainly used to pay for education, medical care and public ceremonial events. A large amount of the public welfare funds were passed up to the brigade through capital accumulation, and payment for brigade-run welfare services such as medical centres and schools (Parish and Whyte 1978).

This public welfare funds were withheld before the team members were paid. The labour share of the production team's output was treated as a residual, since members' cash income was the last to be paid from the team's income. Since the income distribution among team members was designed to firstly fulfil the team's role of social welfare provisions.

2.2.3.2. Income Distribution among Team Members

Team members' labour contribution was measured by the 'work points system', which was widely adopted in People's Communes during the pre-reform period. Work points

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[14] After the Great Famine (1959-1961), productions teams were allowed to keep additional grain as a 'grain reserve' to provide security against famine or war.

[15] It came from several sources, including: (1) sale of grain to the state; (2) surplus from team industries; (3) profit from other team production (Wen 2000).

could be assigned either by time (time rates) or by task (task rates) (see Text Box 2.2). Many teams used both time rates and task rates to measure members' labour contribution (Parish and Whyte 1978). Work points earned by household members were recorded at the household account at the production team.

The work point system was supposed to be used for income distribution among households according to their labour contributions. The total monetary value of income for distribution was calculated by the sum of (1) the retained grain for distribution, valued at the state monopoly price; and (2) the cash income from other production and the sale of grain to the state. The sum total of (1) and (2) was then divided by the sum total of work points of the team, which gave the value of each work point. Income of the household was the total value of work points earned by family members.

Text Box 2.2 The Time Rates and Task Rates of the 'Work Point System' in People's Communes

Under a time-rate system, a member's points were calculated by multiplying the number of days worked during the period with their work-point rating. The work-point rating was based on an individual member's working capability, which was usually decided by age and sex. For example, able-bodied males between twenty and forty-five years of age might receive nine or ten points per workday. Able-bodied females without children might get seven or eight points per workday, and so forth. In principle, whether a team member received the full points of their rating depended upon how hard he/she worked. However, in practice, it was difficult to monitor a member's work and therefore most members obtained the full points for showing up to work (Wen 2000).

Under task-rates, team members earned their work points by completing assigned tasks. The team decided how many work points each job was worth, and how fast the job was done was up to the individual receiving the assignment.

In practice, income distribution among team households did not fully follow the work point system. Instead, grain[16] was distributed mainly according to the number of people in the household, while cash was distributed according to work points earned (Wen 2000). Wen (2000) finds that 'maintaining subsistence' was the priority of income distribution in production teams, especially when per capita output was low. Households without enough work points to pay for their basic grain could usually receive most of their rations. In principle, by doing so they became in debt to the team, and were somehow supposed to repay the debt. However, studies have found that even

[16] In many production teams, usually 70 or 80% of grain were distributed in this way, while the rest were distributed according to household work points (Parish and Whyte 1978; Oi 1989).

though some households could not repay the debt, they still received the basic grain in later distributions (Parish and Whyte 1978; Oi 1989).

Households that earned more than enough work points to pay for grain distribution were eligible for the cash distribution. The amount of cash they received equalled to the balance of the total value of their work points minus the value of grain they received.

The above discussion shows that income distribution among team members embodied the following two features:

- Income distribution was not based on team members' labour contribution. A large proportion of income was distributed evenly for everybody of the team in the form of grain ration, regardless of effort (Kung 1994). As a result, income disparity among team member declined during the People's Commune era (Wen 1994). Moreover, since farmers could not choose the land to work on, nor team members to work with[17], how much members could get for their labour not only depended on their individual effort, but also on many other factors, including the quality of team land, other team members' effort, and the (relative) price of agricultural products set by the government. Lack of incentive working on team land resulted an interesting observation: that output of the private slot was much higher than that of the team land, with the former more than double the latter in some cases (Wen 2000). Overall, agricultural production stagnated for most of the years during the People's Commune period, especially following the failure of the Great Leap Forward. As shown in Figure 2-3, per capita grain production during the 1960s and 1970s barely changed. In fact, it struggled to recover the level of the year before the Great Leap Forward (300 kg/capita in 1956) by the mid 1970s.

- The income distribution process at the production team level was a part of the provisions of the rural safety net. The team contributed to finance the public welfare facilities, usually built and maintained at the brigade or Commune levels. Among team members, the limited food grain was shared so that everybody had grain for

[17] Note that migration between rural and urban areas, as well as among rural villages, was strictly restricted in China during the pre-reform period, with the household registration system. More details of this system are discussed in Chapter 3.

subsistence, regardless their labour contributions. The role of the production team's income contribution is discussed in more details in the following section.

2.3 Rural Social Security System during the Pre-reform Period

The social welfare system in rural China during the pre-reform period could be characterized as a system with three tiers: the family, the collective (the production team in particular) and, finally, the government. The family was supposed to provide the first safety net for its members: childcare, old age support (Parish and Whyte 1978), and looking after family members who needed support for the unforeseen emergencies. This role of the family came partly from social and cultural traditions, and partly from the government law and policies. The role of the production team included helping poor families and providing some community-based welfare services such as medical care and education[18]. If the family as a whole were poor, for example, if it did not earn enough work points to pay for the basic grain ration, the production team would give them the basic grain allocation. This was referred to as a loan, although, in reality, it was understood by all concerned that it was unlikely to ever be repaid. The role of the government in the system was twofold: firstly, the government guaranteed access to land for all working-age, able-bodied rural residents who were members of the production team. Secondly, the government was the last resort when support from both family and the production team (and brigade) failed. For example, when natural disaster damaged the harvest of the team, the brigade or even the entire People's Commune, the government would provide disaster relief.

2.3.1 Family as the First Resort

Traditionally in China, the extended family has been the first resort for help for individuals (Ahmad and Hussain 1991). The support of family included: (1) Childcare of young children; (2) old age support for parents and grandparents who had lost working capacity; (3) support for family members with no working capacity and (4) temporary support for family members suffering from sickness or injury.

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[18] Education will not be discussed here due to space limitations.

The communist Chinese government encouraged this tradition through powerful propaganda, and formalized this custom by enshrining it into national law. For example, as early as in 1950, Article 13 of the Marriage Law said 'children have the duty to support and assist their parents.' Article 15 stated that 'everyone has the obligation to provide and help his parents. If he fails to do so, his parents who are unable to work and have difficulty in making a living have the right to demand that he provides their living expenses.'

Therefore, supporting elderly parents (and other family members in need) was not only a traditional and moral thing to do, but also a legal obligation on other family members. The legal obligation on children to support their elderly parents was especially important in rural areas. While the majority of China's urban residents had relatively adequate retirement pensions[19], there were no formal retirement and pension programs for old people in rural villages. Instead, children, especially sons, were expected to provide for their elderly parents[20] (Parish and Whyte 1978).

The family also provided support for other members in need. There were no childcare facilities in villages. Before school age, young children were usually taken care of by their grandparents who were too old to work the land. Family members who were sick, or injured or who suffered from permanent disabilities were also mainly left to be taken care of by the family[21].

The role of the family in providing security for its members was apparently reinforced by the income distribution procedure in production teams. As discussed in section 2.2.3.2, labour income was allocated to the hand of the household to distribute among household members, rather than to individual farmers. Only a family, rather an individual, could be classified as poor and entitled to borrow grain from the team[22].

The traditional and law-reinforced social security function of rural families provided immediate support for people in need. In cases where the difficulties were beyond the

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[19] See discussions in the next chapter.
[20] Daughters were regarded as brought up for other families, since they would eventually 'marry out' to live with and take care of their parents-in-law.
[21] There was some basic health care in villages, which provided some medical services.
[22] An individual could get welfare support from the production team only if he/she had no family and was too old or too sick to work.

capacity of the whole family, the production team was expected to provide some support.

2.3.2 Social Security Assistance Provided by Production Teams and Brigade

By its nature, the People's Commune system was an organization that integrated government administration and economic management. As a result, the collective, especially production teams and brigades, was the major provider of social welfare services to the community and poor households in rural China during the pre-reform period.

As the basic unit of production and distribution, production teams were expected to take care of the poor families under their administration[23]. The production team's role in providing a subsistence living for its members is examined in section 2.3.2.1. The brigade tended to take care of social welfare issues based on larger population scales, for instance, the financing and administration of the "five-guarantee' program (Section 2.3.2.2), and the so-called 'rural cooperative medical care program' (Section 2.3.2.3). Since the brigade did not engage in many production activities, funding of these social welfare programs mainly came from the public welfare funds retained by the production teams under its administration.

2.3.2.1 The Provision of Subsistence by the Production Team

The most important welfare assistance from the production team was some kind of security of subsistence for its members. As discussed in Section 2.2.3, 70-80 per cent of grain for distribution among team members was distributed evenly as the food ration, the 'basic grain'. Whatever their labour contribution, households almost always received their basic grain ration. In other words, the provision of this safety net was incorporated into the income distribution process in the production team. As such, Ahmad and Hussain (1991:266) note that the People's Commune system

[23] As mentioned before, a typical production team was based on neighbourhood in villages. The quality of land it owned and the capacity of labours it had to employ were exogenously given.

provided each rural family with an iron rice bowl—the bowl symbolizes provision and iron the fact that the level of provision remains unaffected by everyday knocks and bumps, or, in other words, variations in labour performed by a household.

There is a debate about the effectiveness of the production teams' provision for subsistence. Some studies have questioned the adequacy of the grain ration. Oi (Oi 1989) and Walker (Walker 1984) argue that the Chinese government's definition of sufficiency needs to be closely examined. They compare the subsistence level of grain adopted by many international relief organizations (such as the International Labour Office) with that used in China, and conclude that the Chinese definitions of subsistence were much lower than those in the international standard. Indeed, there is evidence that the low level of grain ration forced farmers to manage their grain very carefully to avoid starving[24] (Wen 2000).

The low grain ration was clearly associated with low grain productions[25]. Comparing Figures 2-3 and 2-4, per capita grain consumption in rural areas appears to track (per capita) grain production very closely. Following the trend of grain production, per capita grain consumption rose from 1952 to 1957, and then fell to its lowest level during the first few years of the 1960s. After the recovery of agricultural production in 1962, per capita consumption of grain again rose. However, in 1978, annual grain consumption per capita in villages was only about 193 kg, less than the level in 1957.

Given the low grain production, the production team had to distribute the limited grain fairly equally among its households, in order to provide a subsistence for all members. This resulted in declined income disparity among rural households during the pre-reform period(Wen 2000). In 1978, the Gini Coefficient for rural households was 0.21, and the ratio of maximum/minimum income households was only 2.8 (Zhang 1994). During the period of 1963 and 1978, the safety net provided by the production team was effective in preventing any large-scale famine in villages between 1963 and 1978.

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[24] Farmers usually could only afford to have solid grain meals while working, and liquid grain porridge while not working.

[25] Due to the self-reliance policy during the pre-reform period, domestic grain consumption was determined by the domestic production.

The Great Famine demonstrates that the provision for subsistence by the People's Commune system at the time was not effective. This famine, during 1959-1961, caused up to 30 million deaths, with most of them in the countryside (Ashton, Hill et al. 1984; Dreze and Sen 1989). In 1957, the rural population was 547 million (SSB 1981). Famine on such a scale cannot be explained simply by the failure of the Communes to provide subsistence grain to their members. It was in fact an economic as well as a political disaster, caused by policy mistakes, lack of democracy and natural disaster, as pointed by various studies (Walker 1984; Peng 1987; Dreze and Sen 1989).

The famine occurred after the first year of the Great Leap Forward, which began in the spring of 1958 and ended with the Great Famine from 1959 to 1961. The Great Leap Forward was an economic and political campaign in which the government adopted a series of drastic policies to accelerate industrialization and communisation[26] in China. In the rural area, these policies included mobilizing rural labour to take part in industrial production such as steel making, forcing farmers to plant in high density[27]. In particular, the government promoted communisation in villages by forming very large People's Communes (Xie 1990; Sheng 1991; Ma and Sun 1993). As shown in Table 2-1, a Commune usually included tens of thousands of people. It became the lowest level of government in the rural area, responsible for carrying out state government economic plans. Private plots, domestic animals, and small tools owned by rural households were all communised. Farmers in the Communes were mobilized to fulfil the government political and economic goals. At the peak of this aggressive campaign in 1958, the Communes established mass halls to provide free meals for everybody of the Commune. Medical care and school were also free of charge. This aggressive campaign of communisation was not welcomed by farmers and they responded by being slack in work (Wen 2000).

Following the economic policies during the Great Leap Forward, harvests were reduced dramatically between 1959 and 1961. As listed in Table 2-5, comparing with the average agricultural output of 295.3 kg between 1955 and 1958, production per capita dropped 17 percent in 1959, 28.7 percent in 1960 and 26.4 percent in 1961. These bad harvests were apparently the outcomes of policy mistakes during the Great Leap

[26] See section 2.2.1 in this chapter for more details of communisation during the Great Leap Forward.
[27] It was believed at then time that the high-density planting could increase the agricultural output.

Forward, when communisation heavily discouraged farmers' efforts in production (Wen 2000; Xie, 1990), although the official claimed they were the result of 'natural disasters of the three years' (Peng 1987).

Increased government grain procurement at the time of bad harvest led to the Great Famine. As shown in Table 2-5, net government procurement, that is, the gross procurement minus grain resold to villages, increased significantly between 1959 and 1960. In absolute amount, it rose from 27.2 million tons in 1958 to 47.6 and 40.2 million tons respectively in 1959 and 1960. The ratio of net procurement to total production increased from 13.6 percent in 1958 to 28 percent in both 1959 and 1960. Accordingly, urban per capita consumption rose in 1959 and 1960, compared with 1958. Net grain exported to the world market also increased significantly in 1959 compared with that in 1958. From Table 2-5, it seems that farmers suffered most from the reduction of production. Their per capita grain consumption decreased by 9 per cent and 23 percent, respectively, in 1959 and 1960, from consumption in 1958. It was not until 1961, that the government realized the significance of the famine, and responded by reducing the procurement quota and urban grain quota, and also by importing grain.

This sharp contrast of falling output and grain consumption in rural area against rising government procurement and exports raised questions about the economic management system in China. While the market was eliminated during the Great Leap Forward, the central planning system either failed to obtain adequate information on agricultural production, or failed to interpret the information correctly. Dreze and Sen contribute such a failure to the 'absence of adversarial politics and open journalism' (Dreze and Sen 1989: 214). Studies by Chinese authors (Xie 1990; Ma 1993) show that the more immediate explanation of the failure of the planning system was that, as the result of a series of political campaigns, no government official was prepared to report any negative news to supervisors. As a result, the central planners made decisions, such as increasing the agricultural tax (in kind), and procurement quota, etc, based on false and exaggerated estimations of agricultural output.

Given the political reasons behind the Great Famine, it is not surprising that the provision of subsistence by the collectives (the People' Commune at the time) failed. The Great Leap Forward led to the decline in agricultural output. At the time, the

political environment encouraged government officials to hide the truth and report exaggerated output. There was no channel in the centrally planned economic system where individual farmers' voices could be heard so that their desperate need could be met.

From the social security point of view, the Great Famine revealed important defects in the safety net in rural China at the time. The first problem was that the capacity of the collective to provide for subsistence was determined by the central planner's decision, rather than by its members' efforts in production. The decline in output after the Great Leap Forward was only one instance of this problem. The second problem was that the system did not deal directly with individuals in need, but through its 'agent', the collective. Whenever an incentive was created for the agent not to represent the best interests of commune members, the security system failed.

Both the Great Leap Forward and the Great Famine had important impacts on the subsequent development of economic and social policies in China. Part of the impacts was the institutional adjustment in rural China. From 1962 (see Table 2-1), large-scale People's Communes were divided into smaller ones; The People's Commune became a three-tiered system, with the Commune at the top, the production brigade in the middle and the production team at the bottom; the basic agricultural production and accounting unit was lowered to the production team; Some small private plots were returned to farmers and local markets were reopened.

In addition, the state procurement prices of agricultural products rose by 27 percent in 1962, the government procurement dropped (see Table 2-5); agricultural tax rate was reduced, investment and loans to rural areas were increased (Wen 2000). Following these policy adjustments, agricultural output gradually recovered to the level in 1957, before the Great Leap Forward, by 1978 (see Figure 2-3).

The encouragement for rural officials to exaggerate output estimations was corrected. Actual increases of agricultural output became the major criterion to check on rural officials. During the period after the Great Famine and before the economic reform in 1978, there was no other famine reported in rural China.

The safety net provided by the production team following the Great Famine had its own problems. After the state government took a large share of the harvest through the agricultural tax and its monopoly of grain purchasing and marketing (see Section 2.2.2), the production team had to distribute the major income, food grain, fairly evenly among its members, in order to provide subsistence for all members. As a result, team members' well-being had littlie to do with their effort, leaving farmers with little incentive to work hard to increase output. This is clearly illustrated in Figures 2-3 and 2-4, which show that per capita grain output and consumption in rural China did not improve much after the recovery from the Great Famine.

2.3.2.2 The Brigade and the Five-guarantee Program

The neighbourhood-based production team was meant to look after all its members by providing the security for subsistence food grain. This arrangement was informal. There were other social security programs that were formal, involving more government guidelines and perhaps supervision. However, financial assistance from the government was very limited.

The five-guarantee program was part of this formal social relief system. Introduced in 1956[28], this program targeted the elderly, invalid and orphan rural individuals who had no family to support them. The name 'five-guarantee' tells its major content: providing the five basic needs: the basic food, clothing, fuel[29], education and funeral expenses to the target group (Editorial Board of The Great Encyclopaedia of China 1988).

This program was administered and supervised by the MCA[30]. The daily administration and finance of the program was mainly undertaken by the brigade, which was considered the appropriate size to pool the resources necessary for the program. As mentioned previously, part of the cash revenue of the production team was retained for the public welfare fund, which was usually contributed to the brigade for public welfare

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[28] The principle of the program was established in the 'Demonstration Constitution of the Higher-stage Agricultural Producers' Cooperatives' (Editorial Board of The Great Encyclopaedia of China 1988).
[29] This refers to firewood for cooking and heating.
[30] This program was initially supervised by the predecessor of MCA, the MOI, which was disbanded in 1970 during the Cultural Revolution (1966-1976), when its functions were transferred to several other government organizations. See footnote 1.

programs such as the five-guarantee program. The government role in this program was mainly in making guidelines. However, in cases where the collective had trouble supporting the program, the MCA might help out by providing some financial assistance.

There were two ways of providing five-guarantee assistance either by supporting recipients together or separately. The first approach was designed for those recipients who could not look after themselves. These people were gathered in a 'home of respect for the aged' (*jinglaoyuan*), usually set up by the brigade. At the end of 1978, there were 7,843 homes of respect in rural China, with 12,545 staff members. Altogether, they took care of 104,361 old people and 1,332 orphans. Given the total rural population of 790 million, there were about 1.3 people per 10,000 rural residents receiving this assistance (SSB 1981: 131; SSB 1985b: 285).

Most recipients of the five-guarantee program lived separately. This was less costly for the brigade, and, recipients could usually also get help from neighbours. Overall, in 1978, rural collectives (mainly the teams and brigades) paid 116.5 million yuan[31] to help five-guarantee recipients (MCA 2000). The total number of recipients in that year is not available. However, if the number of 2.9 million in 1980 is used (SSB 1985b: 282), then each recipient received assistance valued at approximately 40 yuan in 1978. This value included assistance both in kind and cash. Compared with the 1978 average per capita expenditure of rural households of 116 yuan (SSB 1985b: 198), it is clear that the support for the five-guarantee recipient was very limited.

As in the case of the subsistence guarantee by the production team, the situation of recipients in the five-guarantee program varied across brigades, depending on the situation of each individual brigade. Recipients were provided with a set amount of grain, oil, and other goods distributed by their teams. The amount was usually the same as for other nonworking old people in the team, but five-guarantee recipients did not need to pay. In addition to the assistance in kind, recipients received 2-3 yuan per month in cash, although this depended on the wealth of the team (Parish and Whyte 1978). However, Parish and Whyte note that whether or not an old person receiving five guarantee support could live securely was largely determined by whether or not he or

she was also engaged in some sort of private endeavour, such as raising chickens or tending a private plot (Parish and Whyte 1978).

The five-guarantee program, though a (central) government initiative, was mainly the liability of the production team and brigade. Effectively, it was financed by taxing team members. Therefore, its nature was more that of community security than of social security.

2.3.2.3. The Brigade and Public Health Care

It is widely recognized that the Chinese government put enormous efforts into providing basic health care for the people during the pre-reform period. Life expectancy dramatically increased from 32 years in 1950 to 69 years in 1982, only six years less than that in many industrialized economies (World Bank 1984). The longer life expectancy followed the combination of several improvements: (a) a reduction in the burden of illness, (b) a reduction in malnutrition, (c) improved water supplies, and (d) better hygiene and sanitation conditions, etc. The health status of farmers also improved significantly during the 1949-78 period. However, huge differentials of health status remained between the cities and the countryside, as well as within rural areas. Again, using the example of life expectancy, it is estimated that average life expectancy in urban areas was 12 years longer than for typical rural areas, while life expectancy in low-income rural areas was 5 years shorter again (World Bank 1984).

(1) Establishment of the Rural Health Care System—Series of Campaigns

The Chinese government initiated a series of large-scale campaigns that contributed to the establishment of a rural health care system. The purpose of these campaigns changed over time. For instance, the earliest of these campaigns was back to the early 50s. It was called the 'Great Patriotic Health Campaign' conducted in both rural and urban regions. The aim was to eliminate disease-carrying pests: rats, flies, mosquitoes, and grain-eating sparrows, these were later replaced by bedbugs, or cockroaches (Ahmad and Hussain 1991). Through successive campaigns, opium addiction was eliminated, and immunization for preventive diseases such as cholera, typhoid, and

[31] The official exchange rate in 1978 was US $1= yuan 1.68 (IMF 1983).

scarlet fever became widely available to children. During these campaigns, public hygiene and sanitary conditions were dramatically improved (Ahmad and Hussain 1991).

The establishment of a medical care system in villages was also initiated by government campaigns. From the early 1960s, especially after Mao Zedong's criticism of the Ministry of Health as the 'Ministry of Urban Lords', more primary medical care was channelled to villages. This involved the following major measures: (1) reassigning medical personnel from the cities and country towns to villages; (2) establishing village health stations; (3) training a large number of paramedics into the so-called 'barefoot doctors' (BFD)[32]; (4) promoting a cooperative health insurance scheme in villages; (5) sending urban doctors to work and teach in county and regional hospitals and also to travel periodically in special medical teams from one rural area to another.

Some of the achievements of these campaigns are summarized in Table 2-6. During the 1949-1980 period, the availability of health technicians and hospital beds per capita in rural China increased by around 10 times.

While the cost of these campaigns to the government budget is not clear, the explicit financial costs could have been very moderate. Firstly, many of the campaigns were carried out by a massive mobilization of the population via a mixture of propaganda and coercion through the People's Commune. As the campaigns were labour-intensive and labour was not remunerated in most case (Ahmad and Hussain 1991), it could be expected that the financial cost to the government was not high (World Bank 1984).

Secondly, in the 1960s the central government adopted a policy that medical costs should neither be passed down to rural families nor paid by the state, but, instead, kept at the intermediate, brigade level (Parish and Whyte 1978). As a result, government budget spending on rural health care was relatively small. For instance, a 1984 World

[32] The name does not mean that these village doctors did not wear shoes, but that they were actually village residents who had been sent to have a short period (usually around 6 months) of medical training. They worked in the village and some even continued part-time labour in the production team, some times barefoot.

Bank study shows that state subsidies for health care of urban residents in 1981[33] was about 26 yuan per capita compared to less than 3 yuan per capita for rural residents.

Indeed, the rural health system was left to be run by the rural collective, especially the brigade. The cost of the operation was born mainly by the brigade from the public welfare contribution of its production teams. So effectively, team members were paying 'tax' to finance the health system. In addition, individual farmers had to pay extra for medical services through the so-called rural cooperative medical insurance scheme.

(2) The Multi-tiered Medical Care System in Villages

Figure 2-5 illustrates the institutional structure of medical service delivered in rural China as in 1978[34]. This was a clinic-based medical service system. At the production team level, there were usually part-time midwives and health aides. At the brigade (village) level, there was often a medical centre with several BFDs. At the commune level, there was typically a commune hospital with about ten beds (World Bank 1984). Doctors had at least medical trainings at polytechnic medical schools. Hospitals might have equipment such as an X-ray machine and were able to conduct some operations (Printz and Steinle 1977). At the highest level of the system was the county general hospital, where doctors had college degrees.

The system worked as a referral network. In the first instance patients went to see the team health worker. If the case could not be handled at that level, the patient would be referred to the brigade level, and could be further referred to each of the higher levels, depending on the case. For problems that could not be dealt with at the county hospital, patients could be further referred to a regional hospital where there were specialists.

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[33] Here the figure for 1981 is used as an approximated indicator for the situation just before 1978.
[34]There was a parallel system that provided for major preventive programs in rural areas. This system was financed by the state budget and was under the administration of the Department of Health. It was responsible for vaccination programs, general control of communicable diseases, monitoring environmental sanitation, assisting in implementing patriotic health campaigns and health education. See the World Bank (1984).

This rural health system was mainly financed by rural collectives, except for hospitals in counties, which were financed from the government budget. Hospitals and clinics at People's Commune and medical centre in production brigades were collective assets. The Commune and brigade used the public welfare fund contributed by production teams to finance the capital investment such as houses and equipment.

The BFD was a unique phenomenon within China's rural medical care system. In 1970, on average, there were 1.8 BFDs per 1000 rural population. By 1975, the number had increased to 2.1 (Table 2-7). The brigade chose from local village residents who had lower-middle or higher-middle school education. They were sent for three to six months training of elementary medicine at a commune clinic or county hospital, before returning to provide rudimentary medical care at the grassroots level in the village medical centre[35]. The cost of training was born by the brigade and wage payment for the BFDs also came from the public welfare fund.

As the foregoing discussion shows, operation of the health system in the People's Commune was financed by farmers through the production team and the brigade.

(3) The Rural Cooperative Medical Insurance Scheme

The rural cooperative medical insurance scheme originated in the 1950s and was promoted by the government in the 1960s in all rural areas. It was a primitive medical insurance organized by the brigade. Its typical form was that of contributing a small amount of money in order for participants to receive some free medical treatment, such as injections, home visit of a doctor, and, perhaps, medicines (Sun 1994).

The following is an example of such an insurance scheme in Guangdong province (Parish and Whyte 1978). The brigade created a cooperative insurance fund from both members' contributions and part of the brigade public welfare fund. Farmers joined the scheme by prepaying an annual fee, which was the same for both adults and children. The fees ranged from zero to six yuan per person, with an average of about three yuan in a sample of 27 villages. For a family of five, this accounted for around 10 per cent of

[35] BFDs were retrained periodically. There were also constant flows of new materials and a bimonthly magazine to introduce new techniques and experiences from model areas. See Parish and Whyte (1978).

their annual cash income. With the contribution, participants could receive reimbursement of some medical expenditure from the fund.

The insurance coverage for medical expenses varied across villages. Usually it included outpatients, hospital costs and some medicines. It covered more expenses for treatment at the brigade medical centre than for treatment at the commune hospital.

The scheme also used other approaches to restrict medical expenses: some schemes only partially covered medication costs and many had limitations on payments for major surgical expenses. In some cases, the scheme set a limit on the amount of medical expenses. In some villages, a registration fee of 5 or 10 cents[36] was charged when a patient visited a BFD.

Most rural cooperative medical insurance schemes were run at the brigade level with an average population of less than 1,200 people[37]. Given its small scale, the capacity of risk sharing was extremely limited. As a result of these and other problems such as mismanagement, abuse of the cooperative insurance fund, etc, many schemes went bankrupt (Zhu 2000; Chen 2001).

During the pre-reform period, China's rural health care system provided affordable, although very basic medical services to rural residents (World Bank 1984). BFDs in villages used cheap traditional medical treatment, such as acupuncture and herbs, to reduce the costs of medical care (Zhu 2000). The collectives (especially the brigade and the team) maintained the operation of the system by financing most of the fixed costs of the medical service as well as the salaries of BFDs. The rural cooperative medical insurance scheme provided another risk-sharing mechanism among farmers.

However, problems with this system were: (1) the system did not provide affordable medical care for rural residents with serious diseases (Sun 1994). (2) The large proportion of rural residents with no medical insurance had to pay full fees for medical services. In 1981, it is estimated that about 29 per cent of China's total population had

[36] 100 cents = 1 yuan.
[37] This is for 1978 (SSB 1981: 131).

no medical insurance. Almost all of them were farmers (World Bank 1984). This indicates that more than 36 percent of rural residents lived without any medical insurance. (3) Since the system was collective-based, large variations could be expected across brigades in terms of quality and affordability of medical services. Usually, farmers in poor villages had less access to medical care compared with those in relatively wealthy villages.

2.3.3 Social Security Programs Provided by the State Government

As previously discussed, the family was the first resort for help for individual farmers in the rural social security system. The collective, especially the production team and brigade, provided some kind of subsistence guarantee for poor families and those individuals in need who had no families. In addition, they also looked after other welfare issues such as the basic medical care. The fact that collectives were responsible for so many important social welfare liabilities in rural China indicates that the People's Commune was an organization that integrated government administration and economic management. Only in cases in which the collective could not cope, such as a serious flood, the state government provided some social security services. Theses services, mainly social relief and disaster relief, were administered by the MCA[38].

Social relief was aimed at supporting households with temporary or long-term difficulties in subsistence. The official policy of social relief during the pre-reform period was: 'Rely on the masses, rely on the collective, produce to help oneself, help each other, with the necessary relief and support from the state' (Wu and Wang 1989). This policy was the guideline for social relief programs and it emphasized that the government would only help the poor when both the family and the collective failed to provide assistance.

One social relief program was the five-guarantee program, which provided necessary food, shelter, clothing, basic medical care and funerals to poor rural residents who had no family support or working capacity (see Section 2.3.2). Recall that it was the collective (brigade and team) that undertook most of the daily administration and financing of the program. The MCA's role was in supervising the implementation of the

program. When the brigade could not afford the five-guarantees to potential recipients, the MCA provided financial support. As a result, collectives often spent much more than the MCA on the program. For example, in 1978[39], MCA expenditure on the five-guarantee households plus subsidies for the collective's home of respect for the elderly[40], was about 56 million yuan, which was less than half the amount paid by collectives for the program (see Table 2-8).

Another social relief program for rural residents was assistance to poor households. Again, recall that production teams were expected to take care of poor families, and MCA's financial support only came in when the local collective (team and brigade) could not take care of all the families in need. In 1978, assistance from the MCA to poor rural households was 175 million yuan, which was a similar amount to that from production teams (see Table 2-8).

Disaster relief was aimed at assisting farmers suffering from natural catastrophes. Assistance included essential food, clothing, shelter and medicine. The principle of disaster relief was the same as that for social relief. It emphasized self-reliance and mutual help within the People's Commune. Disaster relief from the government was only provided if the Commune could not cope with the disaster by itself. Disaster relief was usually sent to the Commune, which then delivered to households through the brigade and team.

Disaster relief usually dominated the MCA's social security provisions. In 1978, the MCA spent 419 million yuan on rural disaster relief, which accounted for about 30 per cent of the MCA's budget that year[41] (Table 2-8).

Finally, it can be seen from Table 2-8 that in 1978, the MCA spent 47.4 per cent of its budget in rural China. Given the fact that 82.1 per cent of population lived in the countryside (SSB 1999: 4), this figure suggests that on average, a rural resident received

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[38] See footnote 1 and 30.
[39] Data is not available for many years. But the available figures for 1978 seem o be good indicators for the general situation.
[40] Recall that the collective's home of respect for the elderly provided support for recipients of the five-guarantee program who could not take care of themselves.
[41] For reference, GDP in 1978 was 362 billion yuan, budgetary revenue 113 billion yuan (both in current values) (Lou 2000: 60).

only about 12 per cent of the financial assistance an average urban resident received from the MCA. This is just one of the many examples of the ways in which rural residents were disadvantaged in the Chinese social security system.

2.4. Conclusions

This chapter reviews the social welfare system in rural China during the pre-reform period, focusing on the major programs as at the end of the 1970s. Due to data limitations, detailed quantitative analysis is not feasible. Nevertheless, the review illustrates the main features of that system.

The rural social security system was established in a centrally planned economy that was attempting a strategy of rapid industrialization. This strategy demanded that the agricultural sector became the net contributor to the economy. To fulfil this function, the government promoted the formation of the People's Communes, as the lowest level of government administration as well as economic management in rural China. The system was established during the 1950s and was then consolidated during the early 1960s, after the Great Famine (1959-1961). The consolidated People's Communes after the famine had three tiers: with the neighbourhood-based production team as the foundation, several production teams in the same village formed the brigade, and at the top the People's Commune, equivalent to the previous township.

The production teams owned land and other capital goods. They were supposed to undertake a few economic and administrative functions. These functions included: (1) conducting agricultural production according to the government economic plan; (2) paying agricultural tax (usually in kind); (3) selling as much yield as possible to the state at the state monopoly prices; and (4) taking care of the welfare issues for its members.

This chapter examines the division of harvest between: the state government and the collective, the collective and farmers, and finally amongst the farmers in the team. Under the state government economic plan, this division ensured that the state obtained a very large share of the harvest through the agricultural tax and the state monopoly of purchasing and marketing of major agricultural products. There was little incentive for

the production team to increase its production efficiency, except for a higher monopoly price for the so-called 'above-quota purchase' and 'negotiated purchase'.

The income distribution amongst team members created little incentive for farmers to work harder, too. In order to provide subsistence to all members, a large proportion of income—the rationed food grain—had to be distributed almost evenly across team members. As a result, income was very similar within a team, regardless of how much work a farmer did. Shirking was a common phenomenon among team members, which negatively affected the agricultural output.

The production team also played an essential role in the three-tiered social security system in rural China. In this system, farmers were pretty much left to be taken care of by their families and/or local communities. Family was especially important for supporting old people, since there was no pension scheme for farmers. The social welfare function of local communities was formalized by collectivisation. Production teams were expected to provide the subsistence for all its members, especially poor families, through the income distribution process. In addition, the team contributed to finance the major social welfare programs that were provided at the brigade's level: the five-guarantee program and the basic medical care. In principle, limited assistance came from the government when the collective could not fulfil their role of social security provision.

Between 1962 and 1978, this community-based rural social security system, by and large, provided a basic safety net for team members, including a subsistence of living, and a rudimentary medical care program[42]. Perhaps the sad lesson that the government and the local officials learned from the Great Famine was to realize that the subsistence of farmers were at least as important as their contribution to the industrialization.

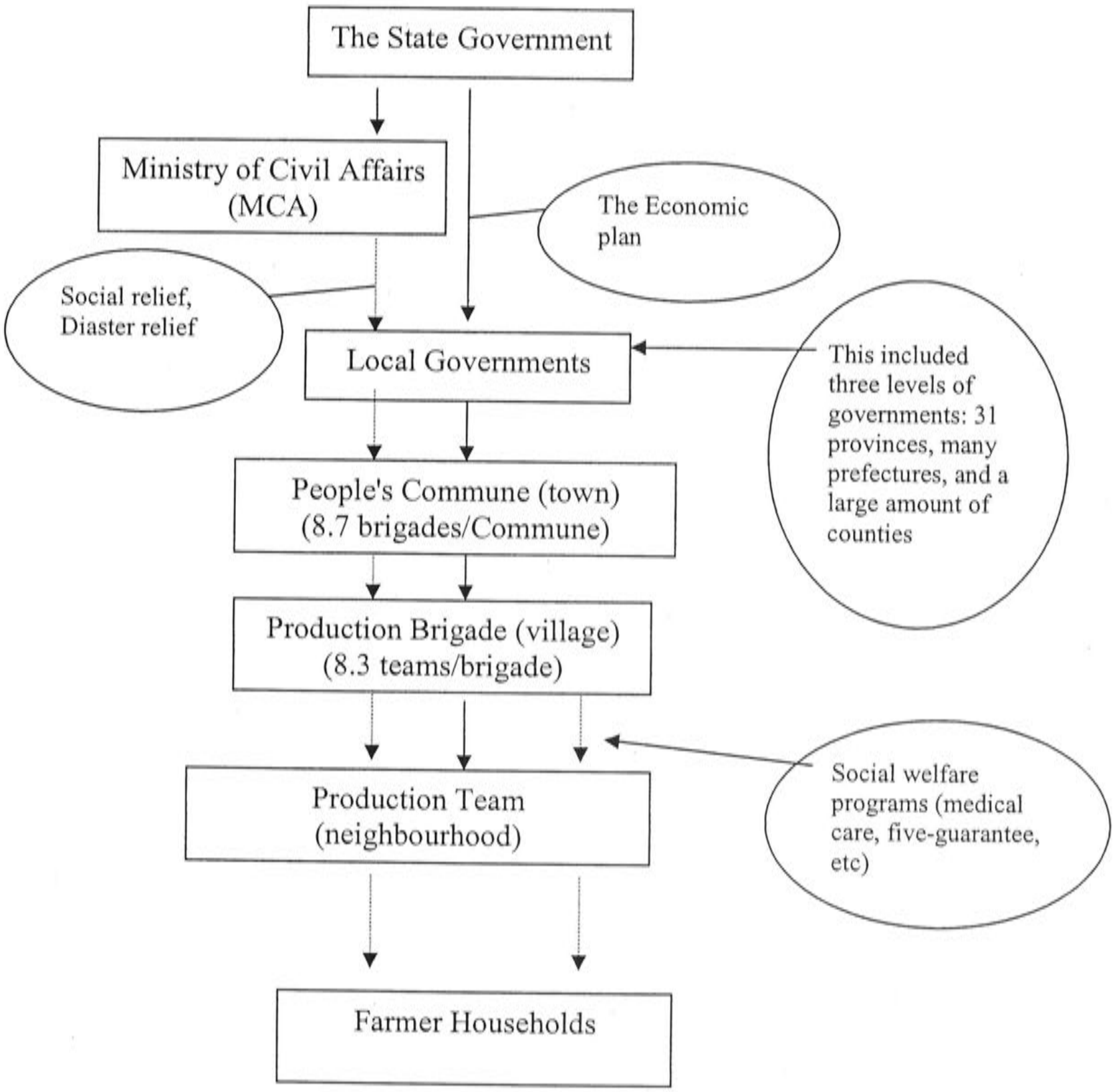
However, the lesson from the Great Famine did not change the pursuing of rapid industrialization by the government. During the pre-reform period, agricultural sector was heavily taxed to finance the industrialization, leaving villages with little incentive to improve output. In the meantime, the capacity of providing social welfare by the

[42] The commune system also provided a primary education system in villages, which is not included in this study.

collective was also limited by this policy. At the production team level, providing a safety net while the output was low meant that most of the income had to be shared within the community, leaving individual farmers little incentive to work hard. This small-community based social security system further exacerbated the incentive problem in rural China.

This chapter studies the rural social security system independently of the urban economy. Indeed, during most of the pre-economic reform period, the rural and urban economies were managed in very different ways by the central government. To be born as a farmer's child in a village resulted in a very different life path and welfare opportunities than to be born as a worker's child in a city. The next chapter will complete the study of the origins of the social security system in China by looking at the social welfare system in urban China during the pre-economic reform period. It shows that to be born in a city was far better than to be born in a village. It will also explore how the gap in opportunities and welfare between rural and urban residents was maintained.

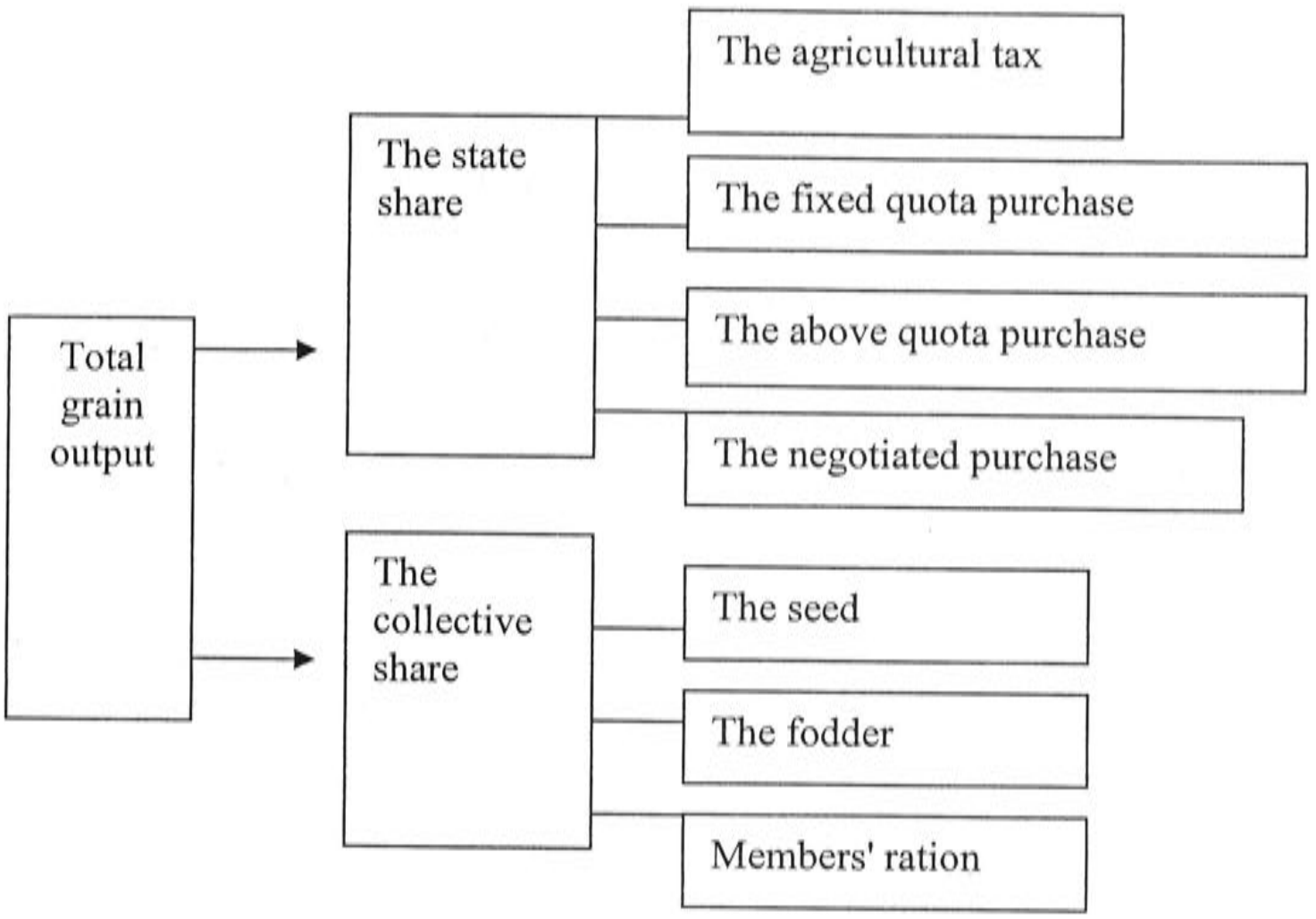
Figure 2-1. Social and Administrative Structure in Rural China during the Pre-reform Period

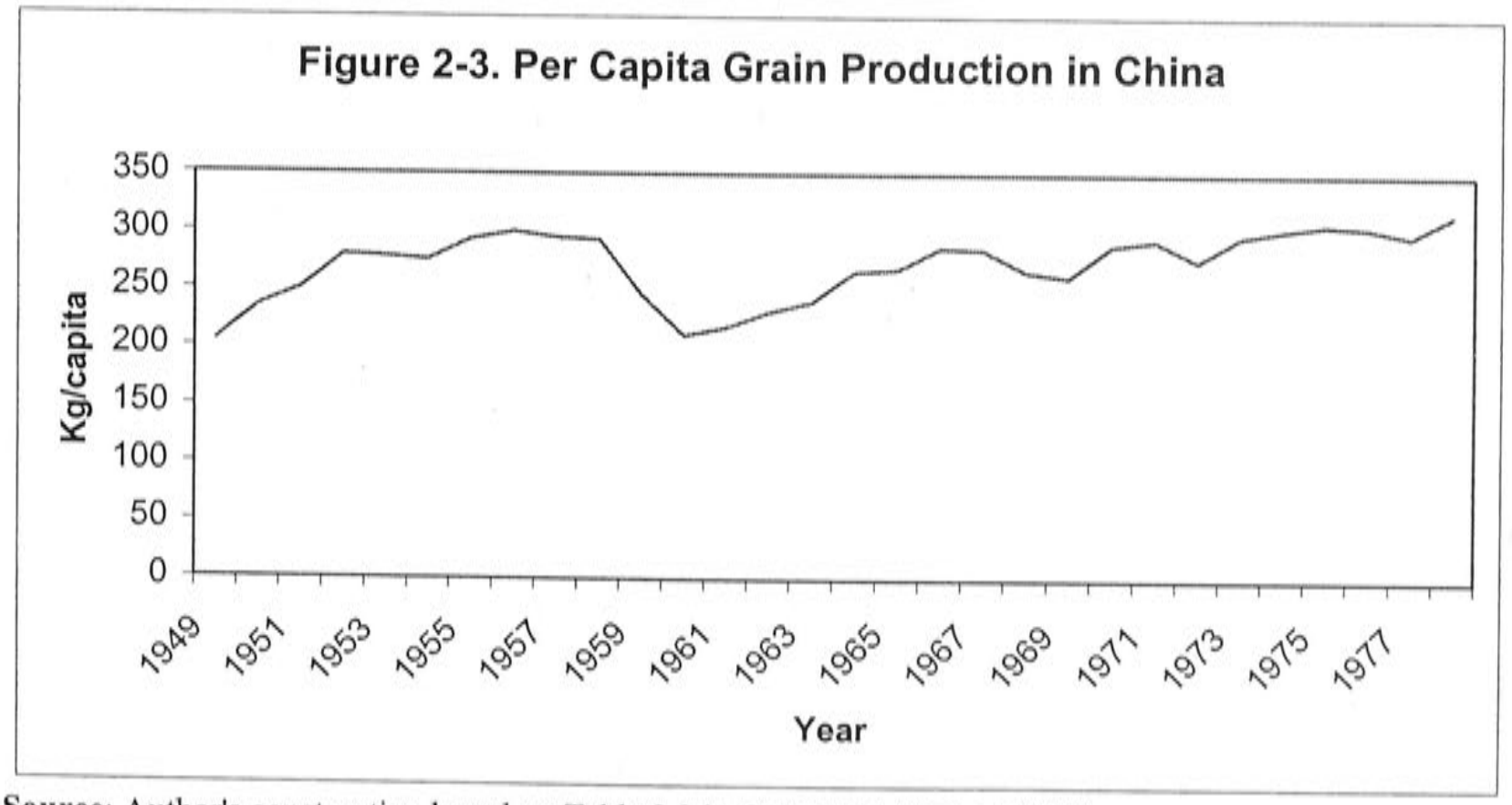


Note: 1. Figures are those in 1965. See section 2.2.1.

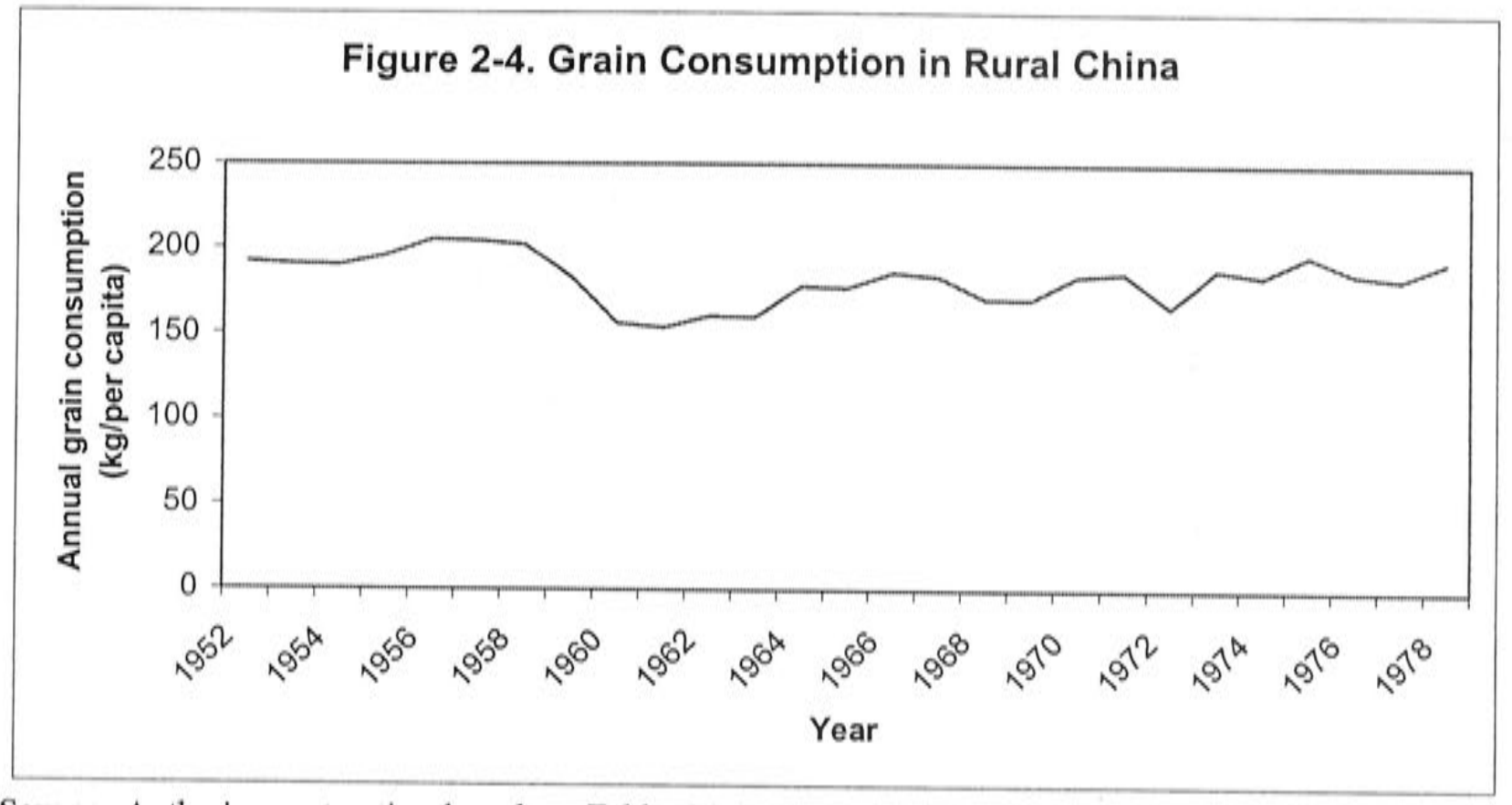
2. Solid arrows represent the hierarchy of government administration and the channel for implementing the economic plan; dashed arrows represent the channel for delivering the social security programs: with the left-hand side line for programs from the MCA and the right-had side for programs from the collectives.

Figure 2-2. The Division of the Harvest during the Pre-reform Period in China



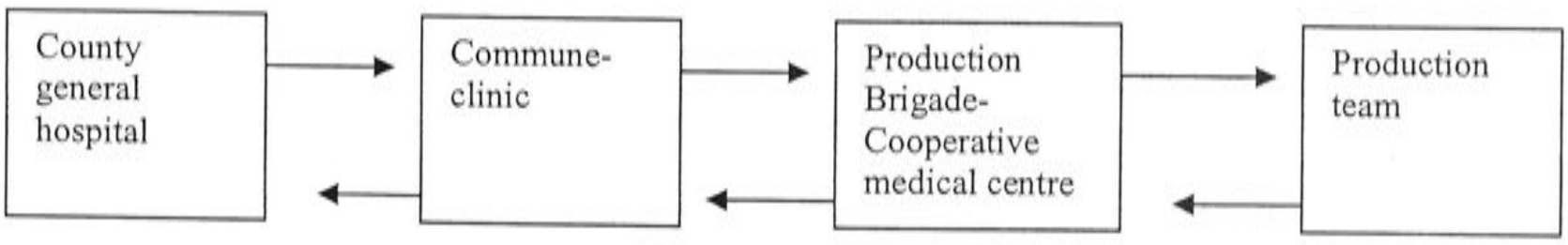


Source: Author's construction based on Table 2.2 in Carter and Zhong (1988).



Source: Author's construction based on Table 5.3 in Carter and Zhong (1988: 90), where the original source from Department of Commerce and Price, State Statistical Bureau (ed.), *Statistical Data of China's Commerce and Price, Statistical Publishing House,* Beijing, 1984.

Figure 2-5. Institutional Settings of Rural Medical services



Source: Based on Figure 3.1.1 of the World Bank (1984: 36). Upper arrows show the direction of supervision and training; the lower arrows show the direction of referral.

Table 2-1. The Process of Collectivisation in Rural China

Stage	From mutual aid group to advanced agricultural producer's cooperatives (1953-1956)			The Great Leap Forward and the People's Commune (1958-1961)	Consolidated People's Commune (1962-1978)
	Mutual-aid group (1953-1954)	Lower-stage agricultural producers' cooperatives (1954-1955)	Higher-stage agricultural producers' cooperatives (1955-1957)		
Major collective measures	Exchange labour, tools and draft animals with each other	Pool land; Farm activities are planned by the co-op's management committee based on the targets set by the government; Small private plot remained, and its products can be sold at the nearby free market	Land, draft animals, large implements and orchards were collectivised.	Specialized production teams were formed; The three level ownership of the People's commune was established (production team, production brigade and the people's commune); Private plots and rural free markets were eliminated; water-irrigation projects with uncompensated use of farmers.	Communes were subdivided into units one-third to one-half as large; The labour management and income-sharing unit was decentralized to the production brigade, and then to the production team; private plots and free peasant markets were restored; Free supply of grain, mess halls, and nurseries were eliminated.
Scale of the collective	7-8 households	20-40 households	N/a	Very large, in many cases included tens of thousands of people	20-40 households per production team.
Ownership of land	Household	Household	The co-op	People's Commune	Production team
Ownership of other capital goods	Household	Household	Private plots, domestic animals and small tools remained in household	People's Commune; private plots, domestic animals, and small tools were all communised.	The team, the brigade and The People's Commune
Income distribution	Extra assistance required reimbursement	Based both on the labour contribution and the share of land and other resources gave over by the household	Based solely on labour contribution of members	Income was distributed by the commune centre; New mess halls provided free food, nursery schools and medical care were provided free of charge.	Income was distributed at the production team level based on work-points.

Source: author's construction based on Huang (1976), Parish and Whyte (1978); Marsh (1985); Liu (1994).

Table 2-2. Agricultural Taxes as Percentage of Total Output during the Pre-reform Period (unit for actual yield: 100 million kg flour and rice)

Year	1950	1957	1962	1968	1970	1975	1976	1977	1978
Actual yield	1097.7	1724.9	1267.4	1940.1	2210.2	2596.1	2586.7	2576.5	2802.3
Agricultural tax (%)	10.7	10.3	8.1	5.9	5.5	4.3	4.3	4.3	3.9

Source: Lou (2000:74-5).

Table 2-3. Grain Sufficiency, Grain Sales and Grain Resale

Minimum per capita Grain Ration (unhusked grain, kilograms/month)	Categories	Compulsory Grain Sales	Grain resale Eligibility
>=15-17	Grain surplus	yes	no
14	Grain sufficient	no	no
<=13	Grain deficit	no	yes

Source: based on Table 7 in Oi (1989: 47).

Table 2-4. Types of State Procurement of Grain in China during the Late 70s.

Type	Year introduced	Compulsory or not	Compensation
Agricultural tax	1949	yes	no
Fixed quota purchases	1953	yes	State fixed price
Above quota purchases	1957	In some areas, yes	Premium price 20-30 percent higher than the state fixed price
Negotiated purchases	N/a	no	Premium price up to 30-50 percent higher than the state fixed price; Opportunities to buy rationed goods at state prices.

Source: author's construction based on Carter and Zhong (1988), Oi (1989)

Table 2-5. Grain Production, Consumption, Government Procurement and Trade for Selected Years in China

Year	Per Capita Grain Production (kg)[a]	Per capita Grain Consumption (Kg)		Government Procurement [d]		Net Grain Export[e] (Million tons)
		Rural[b]	Urban[c]	Net procurement (Million tons)	Net procurement ratio (%)	
1953	278.1	191.7	242.2	30.4	18.2	1.8
1955	293.2	195.7	214.4	32.0	17.4	2.1
1956	299.9	205.0	200.3	22.1	11.5	2.5
1957	295.0	204.4	191.0	32.5	16.7	1.9
1958	293.2	201.8	185.6	27.2	13.6	2.7
1959	245.8	183.1	200.9	47.6	28.0	4.2
1960	210.5	156.0	192.6	40.2	28.0	2.7
1961	217.4	153.7	179.5	25.8	17.5	-4.5
1962	230.8	160.6	183.8	25.8	16.1	-3.9

Source: a. Table 2.2(Carter and Zhong 1988: 5);
b. Table 5.3 (Carter and Zhong 1988: 90);
c. Table 5.1 (Carter and Zhong 1988: 88);
d. Government net procurement = gross procurement minus rural grain resale; Net procurement ratio = net procurement as a percentage of total grain production. Figures for years from 1953 to 1957 are from Table 21 (Walker 1984: 54); Figures for years from 1958 to 1962 are from Table 51 (Walker 1984: 162);
e. Author's calculation based on SSB (1981: 368, 384).

Table 2-6. Availability of Health Technicians and Hospital Beds in Rural China

Year	*1949*	*1957*	*1965*	*1975*	*1980*
Health technicians per 10,000 people	0.21	0.52	0.97	1.79	2.03
Hospital beds per 10,000 people	0.45	0.79	1.37	4.52	5.10

Source: SSB (1985a).

Table 2-7. Health Services in Production Brigades in the 1970s

Year	1970	1975	1980
Number of brigades (thousands)	650.7	675.4	702.9
Number of brigades with rural cooperative insurance scheme (thousands)	498.5	571.4	483.6
% of total brigades	76.6	84.6	68.8
Number of barefoot doctors (BFDs) (millions)	2.2	1.6	1.5
Number of rural midwifes (millions)	n/a	0.6	0.6
Number of brigade health aides (millions)	3.6	3.3	2.4
Total number of other part-time health staff in brigades (millions)	4.8	5.5	4.5
Total, all rural health personnel (millions)	9.6[a]	11.0	9.0
BFD per 1000 rural population	1.8	2.1	1.9
Total, all rural health personnel per 1000 rural population	14	14.4	11.3

Note: a. figure does not include rural midwifes.
Source: health related figures are from Table C-14, World Bank (1984: 155); rural population used are from SSB (1999).

Table 2-8. Social Relief Expenditure and Disaster Relief Expenditure in Rural China (million yuan) (1978)

Social relief	**Total**	**521.5**	**Share in MCA's Budget (%)**
	Total expenditure paid by MCA	**230.7**	**16.8**
	Assistance to five-guarantee households	25.9	
	Assistance to poor households	174.6	
	Subsidy to collective home of respect for the old	30.2	
	Total expenditure paid by collectives	**291.8**	
	Assistance to five-guarantee households	116.5	
	Assistance to poor households	175.3	
Disaster relief	**Total**	**419.4**	**30.6**
	Grain relief	157.9	
	Cloth and quilt relief	27.3	
	Shelter building relief	18.9	
	Disaster induced-sickness relief	12.7	
	Rescue and settlement of victims	N/a	
	Subsidy for resuming production	N/a	
	Other expenditure	N/a	

Source: based on SSB (1985:291); MCA (2000: 117). The figures for social relief are estimated based on the relevant proportions as in 1980. 'N/a' indicates that data are not available.

Chapter 3. A Review of the Social Security Programs in Urban China during the Pre-reform Period (1949-1978)

3.1 Introduction

Following the review of the social security system in rural China during the pre-reform period (1949-1978) in the last chapter, this chapter reviews the social security programs in urban China during the same period. These two chapters not only discuss the origins of the contemporary Chinese social security system, but also reveal the background on which the ongoing reforms have been based.

A simple comparison between the urban and rural social security systems during the pre-reform period may be helpful at this stage. In a sense, the Chinese government's basic welfare policy was to ensure everybody, both in villages and cities, a subsistence living, while emphasizing self-reliance and family support. In rural areas, this included access to land, and the provision of the community safety net by the production team. In urban areas, this included lifetime employment guarantee for all able-bodied, working-age residents. The major difference between the rural and urban social security system was that urban people, especially those in State-owned-enterprises (SOEs), enjoyed far more generous and comprehensive social welfare benefits, which covered employees from the cradle to the grave.

Similar to the social welfare system in rural areas where families were taken care of by the production teams, urban families were looked after by the organization where they worked, the generic name was 'work unit', or simply 'unit' (*danwei*[1])'. The welfare of individual urban residents, and often their families, was very much determined by where they were employed, that is, the work unit. A work unit could be state-owned or collectively owned. It could be a factory, a government organization, a school, a research institute, or a store, where urban people were employed.

The dependence of employees on their work units was significant. Firstly, they received a monthly salary from the work unit. Moreover, once they were assigned a job at a work unit by the government, the employment was lifetime. In fact, due to the government's

full-employment target, sooner or later, almost every able-bodied urban resident would expect to be assigned to a work unit. Secondly, employees received various fringe benefits from their work unit. These fringe benefits were regular non-monetary benefits, such as cheap housing. Thirdly, employees also received wide-range welfare benefits from their work unit. These welfare benefits might be monetary or non-monetary and were provided to employees only in cases of ill health, special need, or misfortune. Examples of welfare benefits included pensions, medical services, and other welfare facilities[2]. As a result of the full-employment policy and the function of the work unit in distributing various fringe benefits and welfare benefits, the wellbeing of the vast majority of urban residents was determined by their work units.

As in the case of the production teams in villages, the urban work units had two major tasks. On the one hand, it was to carry out the government's economic plan, producing goods and services. The government was the decision-maker for these work units, for instance, the number of employees, wage rates, and welfare benefits they were entitled to. On the other hand, the work unit was also responsible for the financing and delivery of social welfare services to its employees (and often their families), including pensions, medical services, and other welfare facilities[3].

For those who were unemployed for various reasons, other social welfare programs were available. These programs were usually delivered by a community-based organization called 'the residents' committee *(juweihui)*[4]. Nominally, the residents' committee was a mass organization that was set up to link local residents with the government. During the pre-reform period, the committee was in fact under the control of the government[5]—the street office, which was the lowest level of government in cities (Wu and Wang 1989). Due to its closeness to residents, the committee was used by the government to provide some social welfare services to the local community. In principle, all local residents had access to the services provided by the residents' committee, including those who belonged to work units (and therefore depended on the work unit for social security). In reality, however, the role of the committee in social

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[1] See Section 3.2.3.1 for further details about the 'work unit' in urban China.
[2] The work unit engaged in less welfare activities before the Cultural Revolution (1966-1976).
[3] See footnote 2.
[4] See Section 3.2.3.2 for further details about the nature and functions of the 'residents' committee'.
[5] The committee is still very much controlled by the local government.

welfare provision focused on those who did not have a work unit to lean on, while people who did have work units tended to rely on them for social welfare provisions (Whyte 1984).

Figure 3-1 illustrates the structure of the channels, through which urban residents could obtain social welfare services during the pre-reform period.

The diagram shows that urban residents were taken care of either by their work units, or the residents' committee of their residential area. Employees of SOEs enjoyed a wide range of social welfare benefits, which were mainly stipulated in the 'Labour Insurance Regulations' (LIR). They included pensions, medical services and childcare[6]. At the end of 1978, there were four government ministries involved in the administration of social security programs for employees. For those who were unemployed, there were only a few limited welfare programs available from the government. The Ministry of Civil Affairs (MCA) was in charge of these programs. The MCA often used the residents' committee to conduct the daily administration and delivery of these services. The target groups of the welfare programs of the MCA was similar to that in villages: people who had no family support, and did not belong to any work unit.

The following relationships are essential in order to fully understand Figure 3-1,

- the government and the work units
- the employees and the work units
- the government and the residents' committee
- the residents' committee and the residents, especially those who were unemployed

These relationships will be discussed in various parts of this chapter. The structure of this chapter is as follows. The second part briefly discusses the social and economic background during pre-reform period. The third part looks at the social security programs available to employees from the work units. The fourth part talks about the social welfare programs, mainly for unemployed urban residents, through the residents'

[6] The LIR applied only to the SOEs and large collective work units, but other state-owned work units, including government organizations, had similar welfare provisions. Small collectively-owned work units were required to provide similar but less generous benefits.

committee. Some overviews of the urban social security system are discussed in the end.

3.2 Social and Economic Background and Labour Mobility

This section covers the major institutional settings that shaped the features of the social security system during the pre-reform period in urban China. While policies and institutions experienced dramatic changes during the 30-year period, the discussion will focus on their impact on the social welfare system by the end of the 1970s.

Section 3.2.1 is about the ownership structure of the economy, since the ownership of a work unit had a strong bearing on the social welfare entitlements of its employees. Section 3.2.2 discusses the full-employment target and the means the government adopted to achieve this end, including the household registration system (HRS) that forbade labour mobility. Finally, Section 3.2.3 provides a general description of the work unit and the residents' committee.

3.2.1 The Ownership Structure of the Economy

By the 1970s, the state-owned sector had come to dominate the urban economy. However, the formation of such a structure took an extended period of time. It included confiscation and socialization of formerly privately owned enterprises in the early 1950s. By 1957, these firms were state-owned (Walder 1986). Formerly self-employed handicraftsmen were collectivised in the mid-1950s: they were either recruited into new enterprises owned by the government, or grouped into handicraft cooperatives.

This socialization process ended up with an ownership structure of the urban economy dominated by the SOEs and other state-owned organizations and institutions—the state-owned work units. Accordingly, a large proportion of urban residents were employed in these work units, which are still referred to by people now. A work unit is an organisation, especially those within the public sector. It may be a factory, a shop, a school, or a government ministry. During the pre-reform period, it had important political economic and social functions (Yang and Zhou 2000).

Figure 3-2 shows the ownership structure of employment in urban China during the pre-reform period. The share of employment in the state-owned work units was 64 per cent in 1952, rising to 78 per cent in 1978 (based on SSB 1981:105, 107). While collective work units employed only 1 per cent of working people in 1952, this share had jumped to over 20 per cent by 1957, and then continued to increase slightly until 1978. In contrast, the number of employees in private work units was drastically reduced between 1952 and 1957, with its employment share dropping from 36 per cent to only 3 per cent (based on SSB 1981: 105, 107). In 1978, there were only about 150 thousand self-employed workers in urban China, which was less than 1 per cent of all employees. Their businesses were strictly restricted to a few industries, such as repairing and handicraft (Emerson 1965; Whyte and Parish 1984; Zhang 1999: 22).

In this publicly owned urban economy, each work unit was under the administration of a level of government or one of its ministries/departments (Yang and Zhou 2000: 60). The government administrative hierarchy is illustrated in Figure 3-3. At the top, it was the national level governments composed of the State Council and its ministries. It was then followed by provincial-level, prefectural-level and county-level governments. At the bottom, it was the lowest level government called the Street in urban areas and the People's Commune in countryside[7].

Corresponding to this administrative hierarchy, each work units, being a factory or a university, had a rank corresponding to its supervisor's position in the government[8]. For example, Peking University is under the direct administration of the Ministry of Education. It is thus a work unit at a higher rank than a local university that is financed and administered by a provincial government. In general, the higher the administrative level, the more important the work unit was for the national economy and therefore, the more 'powerful' the unit was in terms of obtaining funds, materials in shortage, and the provision of welfare for its employees (more details in Section 3.2.3.1).

The close link between work units and the government had significant implications for employees of work units. These employees felt they were linked to the government

[7] In China, not all cities are at the same levels in the administrative hierarchy. For instance, there are cities at the prefecture level, and cities at the county level, and cities directly under the central government.
[8] With the economic reform, the close link between a work unit and the government has been loosen, especially firms. However, many features of the old administrative system are still maintained.

through their work unit. Each work unit was like an operation unit on the whole national machine of economy, politics and society. Any operational surplus of a work unit was transferred to the government, while all losses would be covered by the government budget. As a result, employees were looked after by the government through their work units. In the meantime, since most work units were owned by the government and were administered by a government ministry or agency, the government could carry out its economic and other social or political plans through work units (Yang and Zhou 2000: 60).

3.2.2 The Full Employment Target & Labour Mobility

In the pre-reform period, as part of the central government economic plan, a full-employment policy was adopted in the early 1950s. The aim of this policy was that every able-bodied urban resident should be assigned to a job in one of the work units. However, the heavy-industry oriented development strategy soon fell to generate adequate jobs for the urban labour force. In the meantime, the generous social security programs for urban residents[9] attracted a large inflow of farmers into cities, which was regarded as imposing burden on the government budget (Shao and Chen 1991). As a result, the government introduced various policies to ensure the economic plans (including the full-employment target) to be fulfilled in cities. These policies, along with the communisation of farmers, formed two parallel yet distinctive systems in China: a commune-based rural economy and a state-owned work unit-based urban economy. Accordingly, the social security systems in rural and urban China were operating based on these two different institutional environments. The key to successfully maintain the two social security systems in China was to impose strict limitations on labour mobility between cities and villages.

3.2.2.1 The Full Employment Target

Unemployment was regarded as one of the social evils inherent in capitalism by the communists, and should be eliminated in socialism. The full-employment target also reflected the ideology of self-reliance of the CCP, which was transformed into encouragement for every able-bodied man and woman to support themselves by

working. There is no reliable data on the participation and employment rates for the pre-reform period. One estimate is that the labour force participation rate in 1957 was about 41.5 per cent of the urban population, rising to over 50 per cent in 1975 (Rawski 1979: 29-30). Rawski argues that by 1975, there was evidence both from foreign visitors to China and official statistics indicating a very high employment rate in cities, with an unemployment rate of less than one per cent (Rawski 1979: 33).

There was no labour market in China during the pre-reform period. The mechanism the government used to achieve its full-employment target was to allocate everybody in the labour force to a work unit. Unless the government relocated employees later, they would remain permanent employees of that work unit. During the early 1950s after the prolonged war[10], the expanding economy easily absorbed the labour force in cities. Over time, school graduates became the main source of new labour supply. Typically, the government labour assignment plan was distributed to individual urban schools every year, and the school would determine who got which job, without much consideration for individual preference. If there were graduates who could not get jobs right away, they had to 'wait for employment (*daiye*)'. These youths were often taken care of by their parents, who would make every effort to find a job for them, usually through their personal network[11]. Between the late 1970s and mid-1980s, a practice called '*dingti*' was applied. This was a form of employment inheritance. When one parent retired, other conditions being equal, the work unit where they worked would employ one of the children at priority. This was formally institutionalised in 1978 but abolished in 1986[12].

3.2.2.2 Policies to Achieve the Full-employment Target and Labour Mobility

Achieving full employment (with a high participation rate) in cities was not always an easy task. On the one hand, the industrialization development strategy made heavy industry a priority, which by its nature required a high capital-labour ratio. On the other

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[9] Details of these programs are discussed in Section 3.3 in this chapter.
[10] China experienced invasions from the west and Japan as well as civil wars between the early 20th century and 1949.
[11] As will be discussed Section 3. 4, urban residents' committee might also provide some help to these people.
[12] For more details about the employment situation during this period in urban areas, see (Rawski 1979; Whyte 1984; Whyte and Parish 1984; Walder, 1986; Meng 2000).

hand, during the early 1950s, many farmers migrated to urban areas in search of the high wages and the generous social welfare benefits available there. This generated pressure on the full-employment target, on urban facilities, and on the government budget, which alarmed the government (Shao and Chen 1991: 53). To cope with the potential problems of open unemployment in cities, the government adopted several measures (Yang and Zhou 2000: 53-54), of which the household registration system (HRS) was the most important. It was designed to stop rural-urban migration and to restrict migration between cities. Some other policies implemented at the same time, such as rationing consumer goods, travel restrictions, effectively reinforced the HRS curbing migration. Another measure used by the government was sending down urban residents to the countryside. This transferred the pressure of job assignment in cities to the countryside. These measures are discussed next.

The HRS commenced in 1958, when the document 'Household Registration Regulations of the People's Republic of China' was issued. The system is still in effect, although in practice, the rules have become somewhat slack following the economic reform[13]. The discussions follows describe the HRS before 1978.

There were two basic types of household registrations: rural[14] and urban (non-rural). Whether a household was designated as urban or not depended on whether the usual residential place of the household was in the city or not at the time the HRS was introduced. There were two kinds of urban households for registration purposes: individual and collective households. For the former, each household was issued with a booklet containing detailed information of its members. Births, deaths and marriages were also recorded in this booklet. Urban residents who lived in dormitories in their work units (usually single people) were registered as collective households (Zhang 1987).

The HRS separated Chinese citizens into two groups: rural and urban. In effect, it created a hierarchy that largely determined potential lifetime opportunities for

[13] See Section 5.5.2 for some discussions of the recent policy changes.
[14] Rural household registration was a record of local households, including the basic information of household's members such as name, birth date, sex, relationship with the household head, education, occupation, etc. During the pre-reform period, it was the production team that set up and updated the booklet for all households of the team and handed copies to the brigade and the People's Commune to keep the record.

individuals. Changes of registration status were very difficult, if not impossible. Migration from rural to urban areas, and from other cities to Beijing, Shanghai and Tianjin became very difficult. Exceptions were rare, including enrolment into universities[15], recruitment by the state labour department or staff transfers by the government. Migration from towns to cities and from small to large cities was also strictly restricted. Migration from cities to villages, or from big to small cities, and between cities at equivalent level or between villages were relatively easier in principle (Zhang 1987: 99-100). The HRS ranked peasants the lowest of the hierarchy: above them were residents in towns, small cities, and large cities, with residents in the three big cities of Beijing, Shanghai and Tianjin at the top. While moving upwards was nearly impossible, moving downwards was relatively easier (but still involved lengthy and complicated procedures). Even marriage did not change an individual's household registration status automatically (Zhang 1987: 78-79).

When the HRS was combined with other policies, it became a very effective barrier for labour mobility. One of these policies was the restriction of domestic travel. Official letters from a certain level of administration (usually the work unit) were required when purchasing travel tickets. Another measure was a registration requirement for temporary residents. People who wanted to stay outside their own registration city for more than three days were required to register at the local police station. Hotels were required to keep registries of all guests for examination by the police (Whyte and Parish 1984). These measures made physical movement difficult.

In addition, there was the policy of rationing consumption goods, including basic grain foods, cooking oil and cotton cloth, etc. They were rationed in cities by issuing coupons. Between 1949 and 1978, China had the most comprehensive system of rationing of any country in the world for most of the time (Ahmad and Hussain 1991: 287). The rationing included most consumption goods, and each city had different rationing coupons, which could not be used in other cities. Rationing was based on the information (age, sex) recorded in household registration booklets. Rationed goods could only be purchased at state-owned shops by presenting both the appropriate (local) coupons (for the entitlement) and the money (for the payment). With the rationing,

[15] University students were temporary collective residents in the city of the university. This would change when they were assigned a job by the government when they graduated.

unless they had relatives to help them, people who tried to stay outside registered cities or villages would have no access to basic food. However, due to the shortage of consumption goods, the rationed amount barely met most peoples' own needs, let alone providing spares.

Household registration, restrictions on travels, food rationing, etc. all worked together to reinforce migration restrictions. As a result, labour mobility was very low during the pre-reform period (Whyte and Parish 1984: 20-1; Shen and Tong 1992: 191-7). Indeed, in spite of the rapid industrialization, the share of urban residents in the total population declined between 1960 and 1976. Table 3-1 shows that the proportion of urban population reached a peak in 1960, which was not exceeded until 1981, when the figure rose to 20.2 per cent (SSB 1999).

The peak in 1960 was generated by the changing policies since the late 1950s, as well as the more dramatic policy of sending urban residents to villages, which mainly occurred from the early 1960s to the mid-1970s. The first of these government-organized migrations was in the early 1960s, when some 20 million staff members in the state-owned work units were retrenched and sent to the countryside. This was to reduce the pressure on food rationing in cities during the Great Famine (1959-1961). Along with their family members, this sending down reduced the urban population by about 26 million (Shao and Chen 1991: 59; Shen and Tong 1992: 185; Yang and Zhou 2000: 53-54).

During the Cultural Revolution (1966-1976), sending down to villages was also used to punish people (and sometimes their families) who were regarded by the CCP as having incorrect political views. It is estimated that between 1968 and 1970, hundreds of thousands of this type of urban resident were sent to villages (Shen and Tong 1992: 186). After 1968, the target of regular sending down was shifted to urban youth (Bernstein 1977; Whyte and Parish 1984: 39; Orleans 1982: 132). Other than in special cases such as physical disability, sickness, etc, almost every middle school graduate was required to go to a village. To some extent, working in rural areas for some time became the prerequisite for youth to get jobs in cities or to be admitted to universities (Shen and Tong 1992: 187). There are no reliable official statistics about the scale of this kind of urban to rural migration. It is estimated that 12-17 million youth were sent to the

countryside between 1968 and 1976[16]. This large-scale urban to rural migration obviously effectively prevented further net migration to urban areas. As shown in Table 3-1, the proportion of urban people in the population declined from about 20 per cent in 1960 to 17.3 percent in 1975.

The policy of sending urban residents to rural areas was eased from the mid-1970s onwards. Those urban residents who were sent down as a punishment were allowed to return. At the same time, urban youth who had been sent to villages began to have some access to migrating back to cities. Legal ways of doing this included job assignments in cities, admission to universities, or sickness. Many of them sneaked back into cities illegally, depending upon their parents to look after them.

3.2.3 The Work Unit and the Residents' Committee

The work units and the residents' committees were the basic units that carried out the so-called 'dual administration system' (Whyte and Parish 1984: 22) in cities during the pre-reform period. This was a system of a strict government administration, with strict restrictions on labour mobility. It was also a system that provided comprehensive social protection and insurance, by providing lifetime employment and other welfare benefits. In this system, the real power was in the hands of government, since both work units and residents' committees were under its control. However, urban residents' welfare was delivered by work units and/or residents' committees.

3.2.3.1 Work Units

As previously mentioned, a work unit was the organisation where an urban resident was employed. Work unit literarily means the organisation where a person works. It is a very general term, and could be a factory, a school, a government department, or a mass organization. It could be state owned or collectively owned. There was a close relationship between the work unit (the employer) and the people who were assigned jobs there (the employees). Due to the labour policy at the time, once urban individuals were assigned to jobs, they became permanent employees of the work units. Their well

[16] For example, Rawski's estimation is 12 million (Rawski 1979: 127), while Parish and Whyte's estimation is about than 17 million (Whyte and Parish 1984: 39).

being during the rest of their lives were closely linked to the work unit: salaries, accommodation conditions, children's future, as well as other social security benefits.

The security of salaries and other benefits provided by the work unit, which were determined by the government, were effectively guaranteed by the government budget, especially for the state-owned work units and large collectively owned work units. Small collective work units were in a disadvantaged position, especially in terms of the financial support from the government. As a result, remuneration for labour was lower in these work units, including wages, labour insurance and other benefits. Table 3-2 compares the average annual wage of employees in state-owned versus collectively owned work units. Despite some fluctuations, on average, employees of collective work units earned about 25 per cent less than those in state-owned work units. This wage gap was mainly due to government policies (Whyte and Parish 1984; Li 1991: 124).

The social welfare function of work units was significant in their employees' lives. How much welfare provisions were provided by a work unit varied, depending on ownership, size and the administrative ranking of the work unit. The following list includes the major social welfare benefits a work unit would provide its employees during the pre-reform period:[17]

- The labour insurance benefits stipulated by government regulations[18], such as pensions, and medical care services.
- The 'unit welfare' or 'collective welfare' facilities, such as nurseries, canteens, kindergartens, or even schools.
- Nearly free housing to the employees. The cost of building the houses was met by the government.
- Assistances to family members of the employees, such as entitlements stipulated by government regulations[19], the provision of jobs for unemployed family members, mediation of domestic disputes, etc. (Walder 1986; Yang and Zhou 2000).

[17] See Walder (1986), Yang and Zhou (2000) (in Chinese) for detailed discussions about the role of work units in China.
[18] See details in the next part of this chapter.
[19] For details, see the next part of the chapter.

3.2.3.2 The Residents' Committee

While the work units looked after their employees, the resident's committee looked after urban residents who were either temporarily or permanently unemployed, for various reasons. The number of households under the administration of a residents' committee varied from city to city. For example, in Guangdong Province, a residents' committee took care of 100-800 families, while a street office administered 2,000-10,000 households, (Whyte and Parish 1984: 22).

The nature and function of residents' committee were stipulated in the 'Organic Rules of Urban Residents' Committee' in 1954. The Rules stipulated that the residents' committee was a self-governing mass organization. The costs of the public welfare facilities should be raised among the residents on a voluntary basis, with the approval of the district or city government. The major functions of the residents' committee are the follows:

- Providing public welfare services for the residents;
- Reporting comments and requests of residents to its upper level government, the street office.
- Mobilizing residents to respond to the CCP's call and abide by its regulations;
- Organising mass public security activities within the neighbourhood; For example, assisting the police to maintain public order;
- Mediating disputes among residents.

In practice, however, the residents' committee took on many daily social and administrative function of the government at the grassroots level in cities (Whyte and Parish 1984: 23; Wu and Wang 1989: 141). In particular, it delivered the social welfare benefits that were administrated by the MCA to its residents (see Figure 3-1). It acted as the agency of the lowest level of government, with the head of the committee appointed and supervised by the street office. In addition, the miscellaneous expenses of the committee, and the living subsidy of the committee members were appropriated from the local government.

In general, the role of the residents' committee in its residents' lives was less significant, compared with the role of a work unit to its employees. First of all, the residents' committee did not provide employment, or any social insurance that

employees of work units were entitled to. Secondly, the economic and social dependence of the residents upon their residents' committee was much weaker, compared with that between the employees and their work units. For example, usually the residents' committee was not responsible for providing free housing for the residents. As for social welfare provisions, the role of the residents' committee was unspecific, supplementary to those provided by the work unit, and they were not regular. In general, a typical residents' committee was less dependable, compared with a typical work unit.

The work unit and residents' committee dual administration systems covered all urban resident. People with jobs mainly depended upon the work unit, and enjoyed the income security and welfare services that it provided; while those who did not belonged to any work unit and had no family to rely on had to find assistance from their residents' committee. Both the work unit and the residents' committee were responsible to the government. They were, therefore, the intermediate agencies the Chinese government used to manage the urban population.

The role of work unit and residents' committee in the urban social welfare system during the pre-reform period is shown in Figure 3-4, as part of the overall administrative structure of the system. The Ministry of Labour (MOL)[20], the Central Department of Organization (CDO), the Ministry of Health (MOH) and the Ministry of Civil Affairs (MCA) were the main government ministries[21] in charge of social welfare policy-making and administration. This figure also provides an overview of programs available to urban residents during the pre-reform period. These programs were designed for two distinct groups of urban people: employees (and their family members) of work units, especially those sate-owned[22]; and those who were unemployed. In this system, these two types of programs were delivered by work units and residents' committees, respectively. In general, programs for employees of work

[20] The MOL was the predecessor of the current Ministry of Labour and Social Security (MOLSS).
[21] The CDO is not a government ministry. It is a department of the CCP Central Committee. It is relevant here since it is in charge of appointment of high-rank government and CCP officials and their salary and pension system.
[22] The social welfare programs for employees in other state-owned work units and in large collectively owned work units were similar to the LIR, which applied to employees in SOEs, while those for employees in other collect work units were less generous. In Figure 3-3, programs for workers in SOEs as specified in the LIR are used as examples.

units were relatively well defined, which covered a large proportion of urban residents; while those for the unemployed were much less specific and therefore less dependable.

3.3 Social welfare Programs for Employees of Work Units

There were two parallel systems of social welfare programs for employees in the state-owned institutions (and government departments) and those in SOEs. The eligibilities and benefits of the two systems were very similar to each other. The discussions in this section are based on the system for employees in SOEs.

Among the programs for employees in SOEs, some had well-defined criteria of eligibility as well as formalized rules to determine the quantity of assistance. Examples included the Labour Insurance Regulations (LIR) and its related laws and regulations. Others were informal, with only general principles stipulated by the central government. The detailed implementing rules were left to the local government to specify. Sometimes, even with these detailed rules stipulated by the local government, there was plenty of room left to the work unit. This was done so as to allow for variations across work units. The LIR and other informal fringe benefits as well as welfare benefits are discussed in turn.

3.3.1 The Labour Insurance Regulations (LIR)

3.3.1.1 An Overview of the LIR

Designed to provide social insurance for employees in SOEs, the LIR was issued in 1951 by the Chinese central government. It was revised in 1953. Up until the mid-1980s, there were no significant changes to the LIR. However, some details and administrative arrangements were modified later by supplementary regulations (Shao and Chen 1991). The LIR covered labour insurance, including old age insurance, medical insurance, injury, maternity assistance, and funeral allowance.

The LIR applied to formal (permanent) employees in SOEs, which essentially covered nearly every employee in SOEs by the end of the 1970s. The government required collectively owned work units to set up their own labour insurance programs, with reference to the LIR. These programs had to be less generous than the LIR (Wang 1989). Large collectively owned work units usually had similar labour insurance and

welfare provisions as the LIR, while small ones could only offer very little labour insurance.[23]

The expenditure for programs in the LIR was financed by individual SOEs[24], and there was no requirement for employee contribution. However, in the centrally planned economy, where any operating surplus of SOEs had to be transferred to, and any operating deficit covered by the government, financing the LIR by individual SOEs was essentially backed up by the government budget. In other words, the government budget effectively provided the risk-pooling mechanism of these labour insurance programs. The work unit's major role was to maintain the daily administration and delivery of the benefits. During the pre-reform period, the LIR was a pay-as-you-go (PAYGO) system without an explicit payroll tax, and was delivered by individual SOEs.

The benefits stipulated in the LIR were minimum entitlements. The actual level of benefits was also affected by the financial status of the work unit and the wishes of its decision-makers. As a result, there were variations of labour insurance benefits across work units and over time (For examples see Vermeer 1979).

Table 3-3 summarizes the coverage and expenditure of labour insurance for selected years, mainly during the pre-reform period. By 1978, the LIR covered more than 78 per cent of urban employees (and their families). The LIR relevant expenses increased significantly between 1952 and 1978. However, the ratio of the expenses to the total wage bill did not increase accordingly. Comparing the numbers in 1952 (14 per cent) with 1978 (14.3 per cent) shows that the ratio only increased by 0.3 percentage points.

According to Table 3-3, the number of employees in the state owned sector increased by more than 30 per cent between 1957 and 1962, while labour insurance expenditure only increased by less than 1 percent. As a result, the ratio of labour insurance expenditure to the total wage bill declined from 17.9 to 13.2 percent. This was probably due to the changing age structure of the labour force. Since most of the new employees

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[23] More detailed comparisons of labour insurance programs for the collectively owned work units and those in the SOEs are listed in Table 3 in Walder (1986: 44-5), also see Whyte and Parish (1984).
[24] There was requirement for individual SOEs to contribution for the LIR before the Cultural Revolution (1966-1976), including a social pooling fund. This was abolished when the Cultural Revolution started. Discussions in this section focus on the situation as at the late 1970s (Shao and Chen 1991).

were young and relatively healthy, major costs, such as the old age pension and health care, were not much affected. Accordingly, total labour insurance costs did not increase by much. A survey of 508 Chinese firms shows that the retiree/employee ratio declined during the per-reform period. For the state-owned firms, the ratio during the periods 1950-1959, 1960-1969 and 1970-1979 was 0.31, 0.15 and 0.07, respectively (Li and Zhang 2000: 155). Even though the survey is only for a relatively small number of firms, it does show a significant drop in the retiree/employee ratio in cities during the pre-reform period.

Another observation from Table 3-3 is the comparison between 1978 and 1979. While the number of employees rose by only 3 per cent from 1978 to 1979, labour insurance and welfare expenditures[25] increased by almost 40 per cent. This was quite a significant change, and was due to a sudden increase of retirees in SOEs (Liu 1999). During the Cultural Revolution (1966-1976), the previous retirement system was nearly stopped for various political reasons. Many employees at retirement age could not formally retire. Instead, they stayed at their jobs and received wages. The normal retirement procedure was resumed in 1978. This resulted in a dramatic increase in the number of retirees within a short period of time. There were 2.48 million retirees[26] from state-owned work units by the end of 1978. That number was almost doubled to 4.73 million by the end of 1979[27]. The ratio of the number of retirees to that of the current employees rose from 1:30 to 1:16 (SSB 1985a: 126).

3.3.1.2 Major Programs in the LIR

The major programs of the LIR, explained as follows, are summarised in Table 3-4.

3.3.1.2.1 Old Age Pensions

Regulations for retired and resigned employees were stipulated in the LIR in 1951. They were modified in separate documents later issued in 1957, 1958 and 1978. The main features of the system are:

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[25] This figure includes expenditures for labour insurance programs in the LIR as well as other expenditures for collective facilities, etc. See note of Table 3-3.
[26] Officially, there was a distinction between retirees and resigned ex-employees. The discussions in this thesis use 'retirees' for both types of people.
[27] The numbers for urban collective work units in these two years were 0.3 million and 1.23 million.

(a) Qualifications for retirement and pensions

To be able to formally retire and enjoy old age pensions, an employee needed to satisfy two conditions simultaneously:

- First, at least ten years of continuous service in a state-owned work unit.
- Second, the retirement age was 60 years old for both male workers and staff. For female workers and non-worker staff, it was 50 and 55 years old, respectively. For workers who worked under unfavourable conditions[28], the retirement age was 5 years younger for both male and female workers.

The exception to the above rules was that people could retire due to ill health, whether work related or not.

(b) Pension Benefits

Pensions were paid monthly to retirees until death. The replacement rate (the ratio of pensions to wages before retirement) varied according to the length of employment. It was usually between 60 and 90%. The rates were:

- 90% for retirees who had joined the revolutionary activities led by the CCP during the War of Resistance against Japan (1937-1945);
- 80% for retirees who joined the CCP-led activities during the War of Liberation (1945-1949);
- 75%, 70% and 60% for retirees of 20, 15 and 10 years of employment, respectively.
- The minimum pension was 20 yuan per month, which was about 40% of the average wages of the state-owned work units.[29]
- For retirement due to non-work related illness, the replacement rate was 40 per cent, irrespective of the length of employment.

[28] Examples include working in wells underground, high or low temperature at working environment, etc.
[29] In 1978, the average annual wage for employees in the state-owned work units was about 644 yuan (see Table 3-2), which was about US$ 383 according to the official exchange rate at $1= yuan 1.68.

(c) Settlement Assistance

In cases where retired employees needed to settle in cities other than where their work unit was located, the LIR provided a settlement allowance. The work unit would cover transportation and board costs for the retirees and their direct dependants. A lump sum settlement allowance was also granted: 150 yuan for retirees settled in cities, and 300 yuan for those settled in villages. The allowance was less for people retired due to non-work related health problems.

3.3.1.2.2 Maternity Benefits

Female employees enjoyed 100 per cent paid leave for giving birth or miscarriage. For a normal birth, the entitled leave was 56 days. For twins or complications at birth, an additional 14 days was granted. There was a 20 to 30-day leave for miscarriage. The work unit covered all relevant medical expenditures during pregnancy, including the birth and postpartum period. This included examination fee, delivering fee, operation fee and hospitalisation expenses. The LIR also provided a lump sum supplementary maternity allowance for female employees (and wives of male employees) who gave birth. It was 4 yuan for one child, or 8 yuan per child for twins or more. In cases where the female employee was not fully recovered after the entitled maternity leave, she would be qualified for sickness leave and relevant benefits.

3.3.1.2.3 Work-related Injury and Invalidity

Employees who were injured due to work commitments were entitled to the following benefits:

- Full paid injury leave;
- Free medical care and coverage of all relevant costs, including examinations, treatment, drugs, hospitalisation (including food) and transportation.

In cases in which the injured were diagnosed as disabled, they would be entitled to one of the following benefits, depending on the extent of invalidity:

- Fully invalid: retire immediately and receive a monthly payment, called 'pensions due to work related invalidity' for the rest of life. Pensions equal to 75% wages for cases where nursing assistance for daily life required, and 60% otherwise.

- Not fully invalid: go back to the previous work unit to work[30]. In this case, if the post-injury wages were lower, a monthly subsidy would be granted. It was called the 'work-related disability subsidy'. The amount of the subsidy depended upon the loss of wages due to the injury: if it was 10 to 20 per cent lower, the subsidy should be 10 per cent of the pre-injury wages. If it was 20 to 30 per cent lower, the amount should be 20 per cent. If it was more than 30 per cent lower, the subsidy should be 30 per cent. This subsidy was paid until the injured employees recovered to full capacity or died.

3.3.1.2.4 Sickness, Non-work Related Injury and Invalidity Benefits

Employees who were sick, or injured outside their work environment, had access to free medical services at the clinic (or hospital) of the work unit or its appointed hospitals. The work unit covered the relevant medical expenses including diagnosis, examination, operation, hospitalisation and ordinary medicines. In general, the employee paid for expensive medicines, board costs in hospital and transportation costs incurred. Poor employees, however, could receive some assistance from the work unit for these payments. Application for this assistance was considered on a case-by-case basis, and there were no unified rules.

Sickness (or injury) leave was up to six months. During this period, employees received the sickness (or injury) leave salary. This amount was from 60 to 100 per cent of their usual salary, depending on length of continuous employment in the current work unit. The rules were: for employees with less than 2-years employment, the sickness leave salary was 60 per cent of usual salary. The benefit rose by 10 per cent for every 2 additional years of services, so that fully paid leave was provided for employees with 8 or more continuous years of service.

Employees that needed further leave after six months would eligible for the sickness or non-work related injury relief, until either they recovered, or were diagnosed as disabled[31], or until they died. The amount of the relief was between 40 to 60 per cent of the employee's usual salary, again depending on length of employment. The rules were:

- For less than 1 year of employment: 40% of the usual salary;

[30] The employee could be relocated to another position in the same work unit.
[31] These people would then retire and receive a pension. See Section 2.3.1.2.1.

- For employment between 1 to 3 years: 50% of the usual salary;
- For 3 or more years of service: 60% of the usual salary.
- For low salary employees: the minimum relief was 40% of the work unit's average salary.

This relief was paid until the employee recovered, was diagnosed as invalid or died.

The financial assistance for medical care from the work unit also covered employees' direct dependants, although this was less generous compared with the coverage for employees. In general, medical diagnoses and examinations at the work unit's clinic, or appointed hospitals, were free. The work unit also covered 50 per cent of operation and ordinary medicine costs.

3.3.1.2.5 Death and Funeral Related Benefits

Upon the death of an employee, direct dependants, defined as family members who relied on the employee for a living[32], were eligible for funeral assistance, as well as a dependant pension. The amount of the benefits depended upon whether or not the employee died on duty.

- Any death directly caused by duty, as well as the natural death of a retired employee who had been injured on duty, was classified as death on duty. The funeral assistance for death on duty was the 3-months average salary of the work unit. However, the pension increased with the number of dependants: one dependant could get a pension equal to 25 per cent of the employee's salary; two and three (or more) dependants were eligible for 40 and 50 per cent of the salary, respectively. The pension was paid monthly until the dependant no longer qualified.
- For death due to other reasons, funeral assistance was the 2-months average salary of the work unit. Instead of the dependent pension, direct dependants were eligible for a one-off, lump sum subsidy upon the employee's death. Again, the amount depended upon the number of dependants: one dependant received 6-months salary of the deceased employee, two dependants would

[32]Examples include: (1) grandfather, father or husband over 60 years old or were fully invalid; (2) grandmother, mother or wife unemployed; (3) children, including adopted children, children from previous marriage and children born out of wedlock, and younger brothers and sisters who were younger than 16 years old; (4) grandchildren less than 16 years old whose father died or was invalid, and whose mother was unemployed.

share 9-months of salary; and three or more dependants would share 12-months of salary.

Dependants of retired former employees were also eligible for funeral assistance, as well as a one-off subsidy, when the retiree passed away. The funeral assistance was between 50 and 100 yuan, determined by the work unit. The subsidy was equal to 6-months pension for the deceased retiree if there was only one dependant, 7.5-months of pension for two dependants, and 9-months of pension for three or more dependants.

In addition to the financial assistance for dependants of deceased current and retired former employees, the LIR also required the work units to employ these dependants at priority.

Financial benefits to cover funeral expenses were also granted to the employee upon the death of their direct dependants. If the deceased dependant was more than 10 years old, the subsidy was equal to a half of the average monthly salary of the work unit. It was one-third of the average monthly salary if the deceased dependant was 1-10 years old. There was no funeral subsidy for a deceased dependant younger than 1 year old.

3.3.1.2.6 Paid Home Leave

Employees were eligible for annual paid home leave, if they satisfied the following two conditions simultaneously: (1) at least one-year of employment in state-owned work units; (2) single or married, but living in a different region[33] from their parents or spouse. This paid leave was provided once a year, for two to three weeks. In cases where both the husband and wife were eligible for this leave, only one could take the leave in a year. In principle, the work unit did not pay for travel costs. However, it might provide some subsidies for employees with financial hardship.

3.3.1.2.7 The Provision of Collective Welfare Services

The LIR also stipulated that all employees in the state-owned work units were entitled to the public welfare facilities provided by the work unit. These facilities included a

[33] Usually, this referred to a location that was too far away to allow for regular visit during public holidays.

convalescent hospital[34], a recreation room, a canteen, kindergarten and nursing room, etc, with capital costs, staff salaries and other running expenses paid by the work unit. When using these facilities, employees only paid for board expenses, and there could also be exemptions, if they were under financial stress.

3.3.2 Fringe Benefits and Other Welfare Benefits

3.3.2.1. An Overview of Fringe Benefits and Other Welfare Benefits [35]

In addition to the formal programs in the LIR discussed in the previous section, the work unit was also supposed to provide a wide range of other benefits to its employees, which could be summarised as fringe benefits and other welfare benefits. Examples included heavily subsidized housing, various price subsidies, distribution of rationing coupons for consumer durables, transportation subsidy for travel to work, etc (Yang and Zhou 2000; Song 1994).

Fringe benefits could be divided into benefits in cash and in kind[36]. Most of these provided by the work unit were in kind. Benefits in cash were usually only a small amount. Some were regularly distributed to all employees, such as a winter heating supplement and a summer cooling subsidy. Some were contingent and thus only for employees in need, for example, a family hardship allowance. In kind benefits could account for a large proportion of an employee's income. Perhaps, the most significant item was housing. Childcare and preferential employment opportunities for family members were also important for employees.

Most fringe benefits were usually distributed, at least with some intention to spread them evenly across employees of the work unit (Song 1994; Yang and Zhou 2000). For example, every employee had equal access to public welfare facilities such as kindergarten, canteen, and a store financed and run by the work unit. Housing, in general, was distributed according to the size of the family and employment history. However, this 'fairness' applied only within each work unit, and not across all work

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[34] They usually located at places supposed to be good for relaxation, such as places close to the sea.
[35] The fringe benefits and informal welfare benefits discussed here were common in state-owned work units. For collective work units, they were usually much less generous in terms of the types as well as the amount (Walder 1986).
[36] Here benefit in kind includes entitlement, such as coupons for rationed consumer durables.

units. In an economy where the distribution of goods and services was not performed by markets, but by bureaucracies using direct allocations and legal entitlements, a gap between fringe benefits from the work unit often led to a gap in living standard between employees in different work units. The lack of explicit regulations about the provision of fringe benefits reinforced such gaps. Usually, the higher the bureaucratic level of a work unit, the more important it was for the national economy, and the more access it had to scarce consumption goods for its employees (Walder 1986: 67). However, all other things being equal, the leader of a work unit could be motivated to mobilize more resources than otherwise for distribution. For example, by increasing the share of operating surplus used for public welfare facilities in the work unit, or by increasing the chances of obtaining scarce consumer goods through better personal connections, the leader could bring more fringe benefits to the employees.

Fringe benefits and informal welfare benefits provided by the work unit were important to the wellbeing of its employees. Table 3-5 is one way to show this. It lists family budgetary expenditures of urban employees[37] for selected years[38]. These figures come from the annual household survey, conducted by the State Statistical Bureau (SSB) of China.

Food accounted for about 60 per cent of total household expenditure, which is not unusual for a low-income country. The share of medical expenditure was no more than 2 per cent, which is not surprising, given the nearly free medical services stipulated in the LIR.

An interesting feature of the household budget during this period was the very low share of rent. It was less than 3 per cent for all four years, and only 1 per cent in 1981. This was due to the heavily subsidized housing provided by the work unit. The shares of electricity and water and childcare were also low. These figures suggest that the expenses on these items were heavily subsidized, which was significant for employees' living standards.

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[37] Figures in the table include current employees' families, in both state-owned and collectively owned work units. Since the state-owned work units dominated urban employment, these figures should give good indications for the situation in state-owned work units.

[38] Most fringe benefits and informal welfare benefits still existed in 1981 and 1982, even though the economic reforms started in rural areas in 1978.

Table 3-6 also demonstrates the importance of fringe benefits and informal welfare benefits for urban employees. It lists the major types of these benefits that employees in state-owned work units received in 1978, the end of the pre-reform era. The housing subsidy was calculated as the balance between the estimated actual rent and the rent paid by the employee (Wang 1991). The 'price subsidy' was paid by the government to all urban residents, mainly for food grains, cotton cloth and cooking oil. Since these goods were rationed according to age and sex, etc to urban residents, working-age employees had more rations than children and old people. As a result, the 6.46 yuan in Table 3-6 underestimates the actual subsidy per employee. Public welfare facilities usually included staff bath/shower room, barbershop, laundry, nursing room, canteen and kindergartens, etc. Benefits from these facilities are the sum of the subsidy for running costs and maintenance costs paid by the work unit, but excluding capital costs of these facilities. Therefore, the figure of 11.68 yuan per employee also underestimates the actual benefits. "Others' refers to subsidies such as those for paid home leave travel, wash and haircut subsidy, and hygiene subsidy, etc. Overall, on average, each employee received at least 100-yuan value of fringe benefits in 1978, which was about 16 per cent of the average salary of state-owned work units that year[39].

There were other fringe benefits and welfare benefits that are either difficult to measure in money value, or for which there is no data. Examples include employment opportunities for family members, the distribution of coupons of rationed consumer goods, etc. Therefore, figures in both Table 3-5 and 2-6, underestimate the share of actual value of these benefits in employees' incomes.

3.3.2.2 Major Fringe Benefits and welfare Benefits for Employees in the State Owned Sector

3.3.2.2.1 Housing

Housing was obviously the most significant part of the fringe benefits provided by the work unit. Notionally, employees in state-owned work units rented accommodation (usually a flat) from the work unit, with rent directly deducted from salary. The rent was determined by the government and was heavily subsidized. As a result, accommodation

[39] See footnote 28 for the average wage in 1978.

was almost free. As shown in Table 3-6, it is estimated that in 1978, each employee in state-owned work units received more than 63 yuan subsidy for rent. The actual rent each urban family paid only accounted for a negligible fraction of total household expenditure (see Table 3-5). Indeed, the rent was so low it could not even cover maintenance costs[40] (Whyte and Parish 1984: 84; Wang 1991).

Such a low rent certainly attracted a high demand for housing. However, there was no housing market during the pre-reform period. In cities, most houses were owned either by the work unit or the government. By the early 1980s, in the largest 200 cities in China, work units owned 54 per cent of all rental living spaces, the city government owned 29 per cent and the private sector owned 18 percent (Whyte and Parish 1984: 82). Regarded by the government as a consumption rather than investment, housing was given low priority compared with capital investment in the government economic plan. As a result, the provision of housing was in short supply. The work unit was the major source of allocating limited housing to employees. Single employees either stayed in their parents' flat, or the living quarters provided by their work units, while newly married couples often had to wait in long queues for a small flat, which was always a process that was very complex, and often led to intensive competition among employees[41]. In 1978, Chinese urban residents had only 4.2 square meters of residential area, on average (SSB 1986). Housing distribution rules might vary among work units, but, usually, the rank and length of employment in the current work unit, current housing conditions, and demographic structure of the household were important considerations. Once an employee was allocated a flat, he/she could live there until death, so long as he/she continued to be an employee or a retiree in that work unit.

3.3.2.2.2 Small Supplements and Allowances

Another type of fringe benefit could be called small supplements and allowances. Some examples were the 'winter heating supplement', which subsidized an employee's purchase of coal used in stoves for cooking and heating; 'high-temperature supplements' or direct distributions of cold refreshments to employees during summer months; the supplement for newspaper and books; subsidy for travel costs to work; and the subsidy for bath and haircut, etc. Some of these items are included in 'Others' in Table 3-6.

[40] Some employees of the state-owned work unit lived in the privately or municipally owned housing. They could receive money grants from their work units for repairing housing (Walder 1986: 65).

Others were included in the employee's salary listed as 'allowances'. These supplements and allowances were not as important as the housing subsidy, but they were usually regular and helpful for family income.

3.3.2.2.3 Hardship Allowance and Other Financial Assistance for Poor Families of Employees

During the pre-reform period, the work unit not only took care of its employees, but also their families. If the family experienced financial hardship, the employee could ask their work unit for a hardship allowance. The qualification and amount of the hardship allowance were not explicitly stipulated by the government, but left to individual work units to decide. In 1978, state-owned work units paid a total of 600 million yuan of hardship allowance to employees (see Table 3-6), which was about 1.3% of the total wage bill[42].

Another form of financial assistance was a short-term loan. Employees who had temporary financial difficulties might be able to obtain a short-term loan from the work unit, which in practice might not need to be repaid (Walder 1986: 63).

The effectiveness and fairness of this type of poverty alleviation allocated by the work unit for poor employee families is not clear, due to data limitations. However, it was understood that the work unit had the liability to look after of its employees so that no destitution should occur.

3.3.2.2.4 Public Welfare Facilities for Employees

The work unit was also expected to provide a wide range of public welfare facilities to its employees. In addition to the clinics, childcare and nurseries, etc. that were required by the LIR, the work unit usually provided many other services that might not otherwise be available. The work unit was more than an economic agent. It was like a mini society that looked after its employees, from employment to family welfare; from economic production to public welfare facilities. Within the range of the work unit, were barbershops, public baths, kindergartens, clothing repair shops, movie shows (outdoors or in halls), grocery shops and meal halls. These services might not all be free of charge, but they were subsidized by the work unit. In 1978, state-owned work units paid

[41] This is mainly from the author's personal experience while living in China.

a total of 870 million yuan net for running these facilities (Table 3-6), about 1.7% of the total wage bill. Moreover, food and consumer goods sold by these services could provide employees with another channel through which to obtain rationed or unavailable goods.

3.3.2.2.5 Preferential Employment Opportunities to Family Members

During the pre-reform period, the work unit was also expected to help with finding jobs for members of an employee's family (Whyte and Parish 1984). Offering temporary jobs and setting up collective factories were two important approaches the work unit often used to hire these unemployed family members. In 1978, the inheritance of jobs in the state-owned work units was institutionalised by an official decree, 'The Temporary Regulations for Retirement and Resignation of Workers'. It stipulated that when an employee in a state-owned work unit retired or resigned, his/her children should be employed at priority by the work unit when finding a replacement. This formalized employment heritance was an extreme case of the social responsibilities undertaken by the work unit[43].

3.3.2.2.6 Distribution of Rationing Coupons for Scarce Consumer Goods

Some of the distributions of rationing coupons for consumption goods were also done through the work unit[44]. Coupons for daily essentials, such as food and clothes, etc, were allocated according to the demographic characteristics of a family. However, coupons for many consumer durables, such as sewing machines, bicycles, radios, watches, and furniture, were mainly distributed through work units. The role of the work unit was not simply a passive distributor of allocated coupons, but also an active negotiator engaging in 'out of the plan' deals with the state administrative agencies, or other work units, to obtain more coupons for its employees (Walder 1986). These deals could bring either extra coupons, or rationed commodities, to be distributed within the work unit, sometimes at subsidized prices.

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[42] The total wages in state-owned work units in 1978 was 4,687 million yuan (SSB 2000a: 28).
[43] This policy was abolished in 1986 (Wang 1989).
[44] The other delivery agent was the residents' committee.

3.4 Social Welfare Programs for Other Urban Residents

While the work unit took care of its employees as well as their families, during the pre-reform period, there were urban residents who did not have work units to rely on. If they were family members of employees in state-owned work units, they could receive some assistance from their relative's work unit (Recall the dashed arrow in Figure 3-1). Otherwise, these urban residents had to look for help from the MCA and the community-based residents' committee. This section discusses the major social security programs available to these urban residents during the pre-reform era, including formal programs from the MCA and the informal programs from the residents' committee. Political ups and downs during the Cultural Revolution (1966-1976) exacerbated the problem of lacking data. Therefore, this section focuses on policies of these programs. Some figures are available for 1978, which are used to provide some indications with regard to the scale and coverage of these programs.

The formal programs were administrated by the MCA[45]. Formal programs included social relief (including disaster relief), and welfare factories for disabled people[46]. The daily administration and the delivery of these programs were the responsibility of the street office and residents' committee. This was because as the agencies at the grassroots level, they had the most updated information about the households within their jurisdiction (Wang 1996: 147).

Several informal social welfare assistance programs were also administered and delivered by the street office and residents' committee. Examples were the setting up of small collective workstations to provide jobs for local unemployed, and the provisions of services for local residents. However, informal assistance was usually a policy response to transient social issues, for instance, high youth unemployment, rather than a reliable source of assistance for people in difficulties.

[45] See footnote 28 in Chapter 2.

3.4.1 Social Relief

The social relief policy between 1954 and 1978 emphasized self-reliance and community assistance before any direct government relief[47]. There were two main types of social relief. The first one applied to general public in the form of regular or temporary relief. Recipients received a monthly stipend if they were granted regular relief. Temporary relief was usually granted to those who had financial stress due to unexpected events, such as natural disasters (Wang 1996: 146). There were no clear rules about either eligibility for or quantity of social relief. This was left to be decided by the local MCA. Overtime, the program became focusing on people who had no reliable income, no family and no working capacity, the so-called 'people without the three essentials' (Wang 1999).

The second type of social relief targeted special groups, whose lives were adversely affected by previous government policies. The government used the special social relief to provide some sort of compensations for those among these groups who experienced financial hardship. As a result, the qualification for and the amount of relief were different from the first type of social relief, and they varied across these special groups. The first of these groups was the so-called 'retrenched employees', which included the 20 million dismissed ex-SOE workers in the early 1960s, as part of the government's effort to cut urban employees[48]. Some of these workers were qualified for a special type of social relief, which amounted to 40 per cent of their salary and two-thirds of any medical expenditure. Only those people who satisfied all the three conditions qualified for this relief: (1) they must have become employees of state-owned work units prior to the end of 1959, and have been retrenched during the 1961-1965 period; (2) They must have had lost most or all of their working capacity, or were too weak or too sick to work; (3) had poor families, and no other relatives to lean on (Wu and Wang 1989: 95). Other special social relief groups were poor people who suffered political persecution during the Cultural Revolution (1966-1976), including some of the sending down youth, who experienced financial difficulties back to cities due to sickness or invalidity.

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[46] In China, other programs are often included as well, such as the preferential treatment of current and ex-servicemen and their families, collecting and sending back vagrants, etc. All these programs are still operating in 2002, although some of them have now been substantially reformed.

[47] See Section 2.3.3 in Chapter 2.

The MCA's spending on social relief was funded by three major sources: (1) the government budgetary appropriation to the MCA; (2) the operating surpluses of some institutions affiliated to the MCA[49]; (3) donations from organizations and individuals. There are no data available for the proportion of each component of the budget, or for the share of social relief expenditure in the MCA's budget during the pre-reform period.

3.4.2 Welfare Factories and Facilities for People in Special Needs

The other formal social welfare program provided by the MCA focused on providing facilities for people in special need. This program included two parts: the first was aimed at providing employment opportunities by setting up welfare factories for disabled people; while the second provided care for other people in need, such as welfare homes for the elderly, mental homes for the mentally disordered, and children's homes for orphans. During the pre-reform period, these welfare homes mainly took care of those needy people who did not have any family support (Whyte and Parish 1984: 75).

In addition to the MCA, the government encouraged the entire Chinese society to take part in the provision of these services. During the pre-reform period, in addition to the MCA, work units, street office and residents' committees in cities were also encouraged to build welfare facilities for local disabled people, as well as welfare homes for people in need. The MCA sometimes supported these services by granting some financial support (Yu, Shi and Feng 1996).

Evaluation of how these social relief and welfare factories/institutions programs worked is difficult, due to lack of data for most years during the pre-reform period, except 1978. Using the figures of 1978 for the discussion is expected to provide only a snapshot of the coverage and effectiveness of these programs. The official number of people in the target group for social relief[50] was 69 million (MCA 2000: 115), which includes both rural and urban poor. Among the 69 million, assume 18%[51] were urban recipients.

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[48] For more details of this event, see Section 3.2 of this chapter.
[49] For example, welfare factories built by the MCA to employ disabled people earned surpluses. See the next part of this section.
[50] The target group include both of the two main types of social relief in cities and recipients in villages.
[51] 18% was the share of urban population in the total population in 1978 (SSB 1985a).

There were 12.4 million urban recipients. The MCA spent about 112 million yuan in cities on this program. Therefore, each urban recipient received about 9 yuan (about US$ 5.3) from the social relief program. This was about 1.4 per cent of the annual average salary of employees of state-owned work units in 1978[52].

From the total urban population point of view, 12.4 million urban recipients of the social relief program accounted for 7.2% of urban population in 1978[53]. However, this figure does not reflect the extent of urban poverty during the pre-reform period. This is because work units looked after their employees with poor families by providing hardship allowances (see Section 3.2.2.2.3 of this chapter). This hardship allowance can be regarded as the counterpart of the social relief program of the MCA. Due to the full-employment policy during the pre-reform period, most urban residents had jobs in work units. Thus the number of people eligible for social relief from the MCA was quite small.

For the program of social welfare factory/institution, Table 3-7 shows some figures for 1978. Overall, there were about 92,000 individuals (mainly in cities) benefiting from this program, with facilities provided by both the MCA and work units[54]. With an urban population of 172 million (SSB 1985a), the coverage was very small[55]. Without further information about the number of people eligible and the decomposed figures of the MCA and work units, it is difficult to evaluate the effectiveness of this MCA program.

The discussions of the formal social security programs administered by the MCA show that the target groups were very small in cities. This was because the work units, especially those state-owned, were responsible for the wellbeing of their employees and their families. When the urban Chinese economy was dominated by these work units during the pre-reform era, social security programs of the MCA did not have a significant role in providing social assistance for the needy group. The limited data available also show that the amount of the assistance provided by the MCA was small.

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[52] For the average salary, see Table 3-2.
[53] Urban population was 172 million in 1978 (SSB 1985a).
[54] The original figure does not provide the amount from the MCA and work units separately.
[55] No figures available for the number of people targeted by the program. Thus it is hard to estimate how effective the program was.

3.4.3 Informal Social Welfare Assistance from Street Office and Residents' committee

The informal social welfare programs were provided to urban residents by the grassroots government—the street office, and its agency in the community—the residents' committee. The target group of these programs were mainly, but not exclusively, those outside the work unit system[56], guided by government policies (Chan 1993)[57]. With limited funds from the government, these organizations had to motivate local people to contribute to community welfare services[58]. As a result, the services were neither regular, nor dependable. Here are two examples of these types of community service.

One example of these community services was creating employment opportunities for unemployed local residents. In the late 1950s, the government urged the street office and the residents' committee to build up small collective firms to absorb the then large number of housewives, who had not previously been in the labour force. This policy was in line with the idea that all able-bodied people should work to support themselves. There was another wave of setting up collective firms at the community level during the late 1970s. This time, it was a response to the government call to find employment opportunities for the returned urban youth who had been sent down to the villages (Yu, Shi and Feng 1996).

Another example of the informal social welfare programs was some community services organized by the street office and the residents' committee. During the pre-reform period, investment in service facilities was regarded as part of consumption expenditure, which did not contribute to capital accumulation. Therefore, the government's economic plan put little resources into this sector. While employees could rely on public welfare services provided by the work unit, unemployed people had to find help from the community welfare services. Usually, the street office and the residents' committee built up services, such as bicycle repair, in collectively owned workshops, with funds raised mainly within the community. These workshops hired

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[56] Employed local residents usually had access to some services as well, especially those that charged fees (the dashed arrow in Figure 3-1).
[57] Chan (1993) gives a detailed description of the role of the street office and the residents' committee in providing social welfare at the community level during the 1980s.
[58] As other social welfare activities in China, the community-based welfare supports had ups and downs during the per-reform period. See Dixon (1981) for a detailed description.

people in the community. Since there was little or no government financial support, these services tended to be small and primitive.

3.5 Conclusions

This chapter has reviewed the social welfare system in urban China during the pre-reform period. Because of the political upheavals during this period, the discussions have focused on the situation at the end of the 1970s. The main features of the system are summarised here.

1) The social welfare system was designed as part of the overall economic, social and administrative system in China during the pre-reform period (Section 3.2). In building up a centrally planned economy, the urban economy was dominated by publicly (including state and collective) owned work units, which were supposed to provide jobs to all able-bodied urban residents. To achieve the full-employment target, various measures were adopted to reduce labour mobility: a stringent household registration system was the most important one. For administrative purpose, urban residents either belonged to a work unit that was administered by a level of government directly or a government agent, or a residents' committee that was under the control of the street office, or both. Employees' welfare was taken care of by work units; while the unemployed usually had to get assistance from the MCA and the residents' committee.

2) Compared with the social welfare system in rural China during the same period, the welfare benefits for urban residents were much more extensive and much more generous. Compared with the community-based rural social security programs, the urban system was essentially supported by the government budget, despite the fact that the programs were operated at the individual work unit level.

3) Within the urban social security system, the work unit played a dominant role. Employees in state-owned work units enjoyed generous social security provisions, which covered old age, maternity, work and non-work related injuries and invalidity, sickness, death, paid home leave, and a wide-range of public welfare facilities within the work unit. These provisions not only covered

all employees, but also their families. In addition, employees received many fringe benefits and welfare benefits, which ranged from free accommodation, childcare and hardship allowance to small supplements and allowances for various purposes. This work unit-based social security system covered all employees (and their families) in state-owned work units and large collective work units. These people accounted for the vast majority of urban residents. The system operated on a PAYGO basis that was managed by individual work units, but was effectively financed by the government budget. It had no explicit employee contributions.

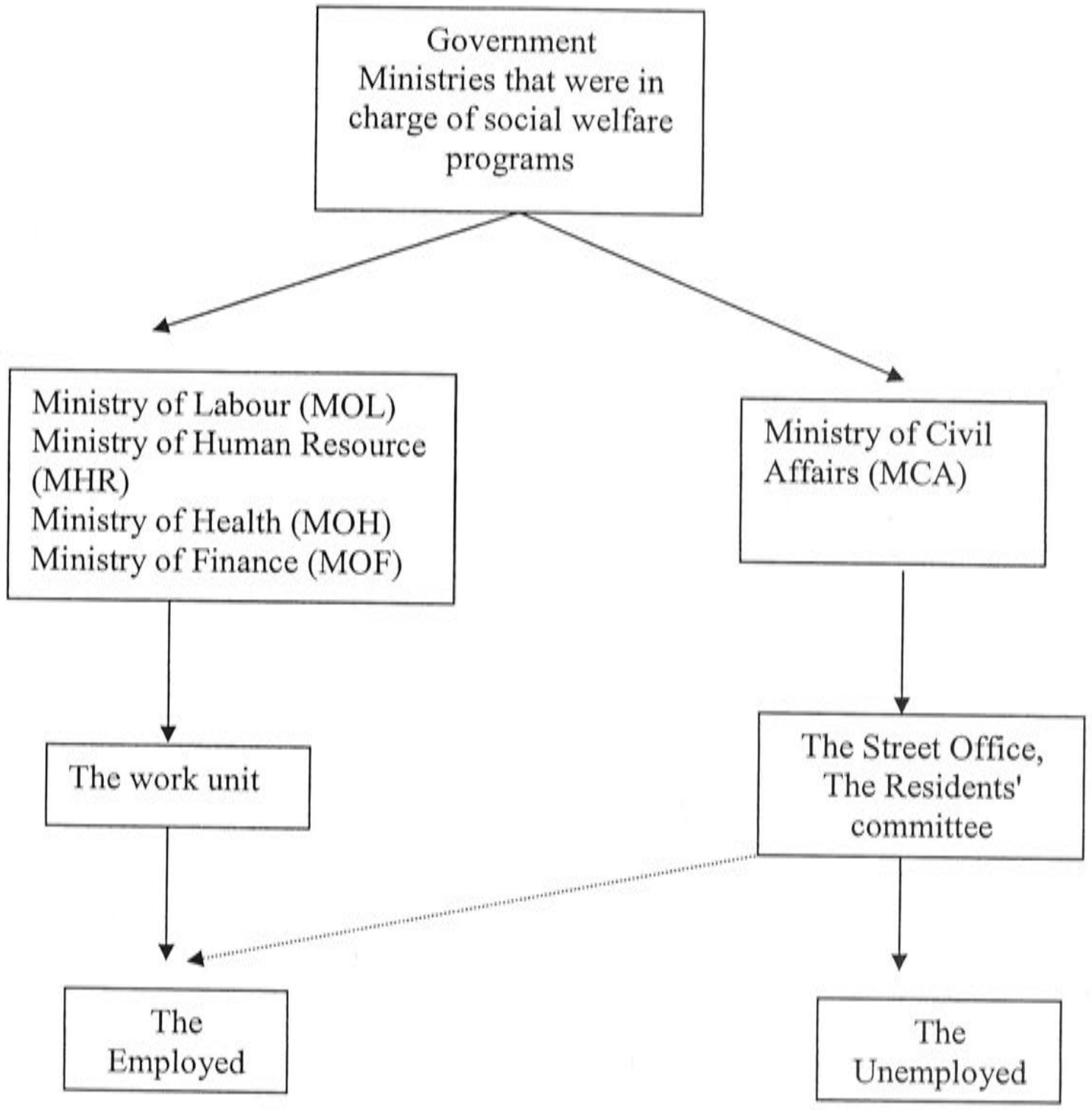
4) The other part of the urban social security system was designed to look after urban people who were not employed in any work unit, and had no access to the work unit system through other family members. This system therefore covered those who were unemployed, had no families, and no working capacity. The formal social security programs of this system were administered by the MCA, financed by government budgetary appropriations and other sources. The informal programs that were provided by the street office and the residents' committee were mainly financed by the local community. Compared with the social security benefits of employees, these programs were far less generous or dependable.

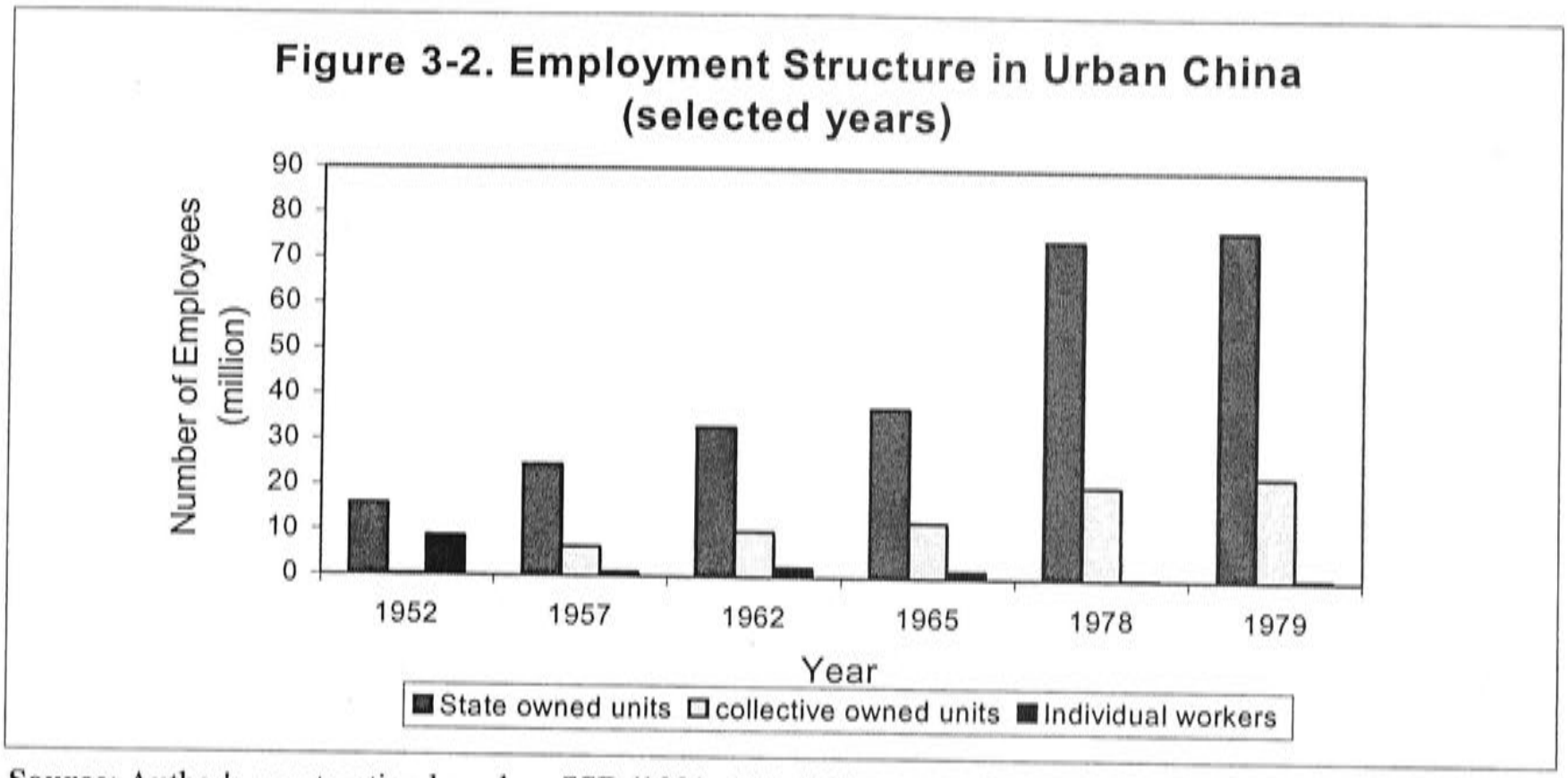
5) The urban social welfare system contributed to a social stratification within cities. Urban people were usually referred to as 'members within the system' or ‘members outside the system' (Yang and Zhou 2000: 40), where the 'system' referred to the state-owned and large collective work unit system. People in this system were at the top of society in terms of economic welfare as well as other social and political benefits. Employees of collectively owned work units were at a lower level, while the unemployed were at the bottom. Within each of the first two categories, people could be further divided into different subgroups depending on the scale of social and economic welfare benefits provided by different work units. Employees of large work units, or work units that were important in the central economic plan, received even more generous welfare benefits than those at small or less significant work units.

The impact of this stratification was two fold. On the one hand, it generated welfare disparities among urban people in different categories. On the other hand, within each category, each subgroup, and each work unit in particular, the distribution of social welfare benefits was relatively equal. Once a job was assigned, the employment was for life, the wage was fixed, and social welfare benefits were simply the non-wage incomes, which generally depended on age and length of employment. Since this system applied to wages as well as other benefits, there was no incentive to work hard, since every worker in the same cohort and the same work unit would have the same salary and similar social welfare benefits that were not related to labour contributions.

This work units dominated social security system in urban China was challenged by the economic reforms that started in 1978. With the establishment of a market-oriented economy, this system had to be reformed dramatically. In the following chapters, the discussion will focus on the impact of economic reforms on this social security system, reforms of this system during the 1980s and 1990s, and the prospect for future reforms.

Figure 3-1. Channels by which Social Welfare Services were Delivered to Urban Residents during the Pre-reform Period in China





Source: Author's construction based on SSB (1981: 105, 107).

Figure 3-3. China's Administrative Hierarchy During the Pre-reform Period

Note: R for residents' committee.

Source: Adopted from Figure A11. in Zhu (1999), except minor changes.

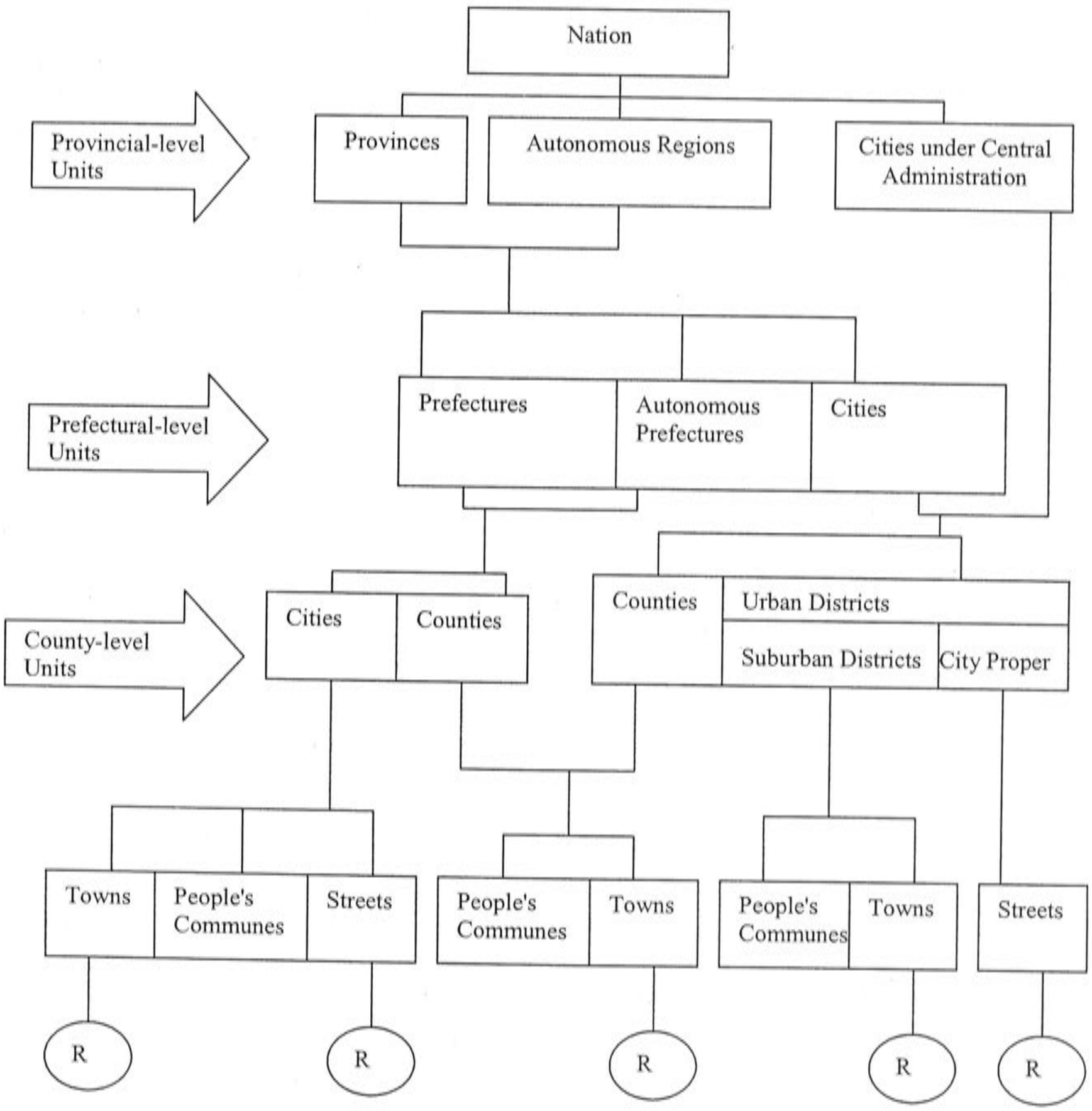
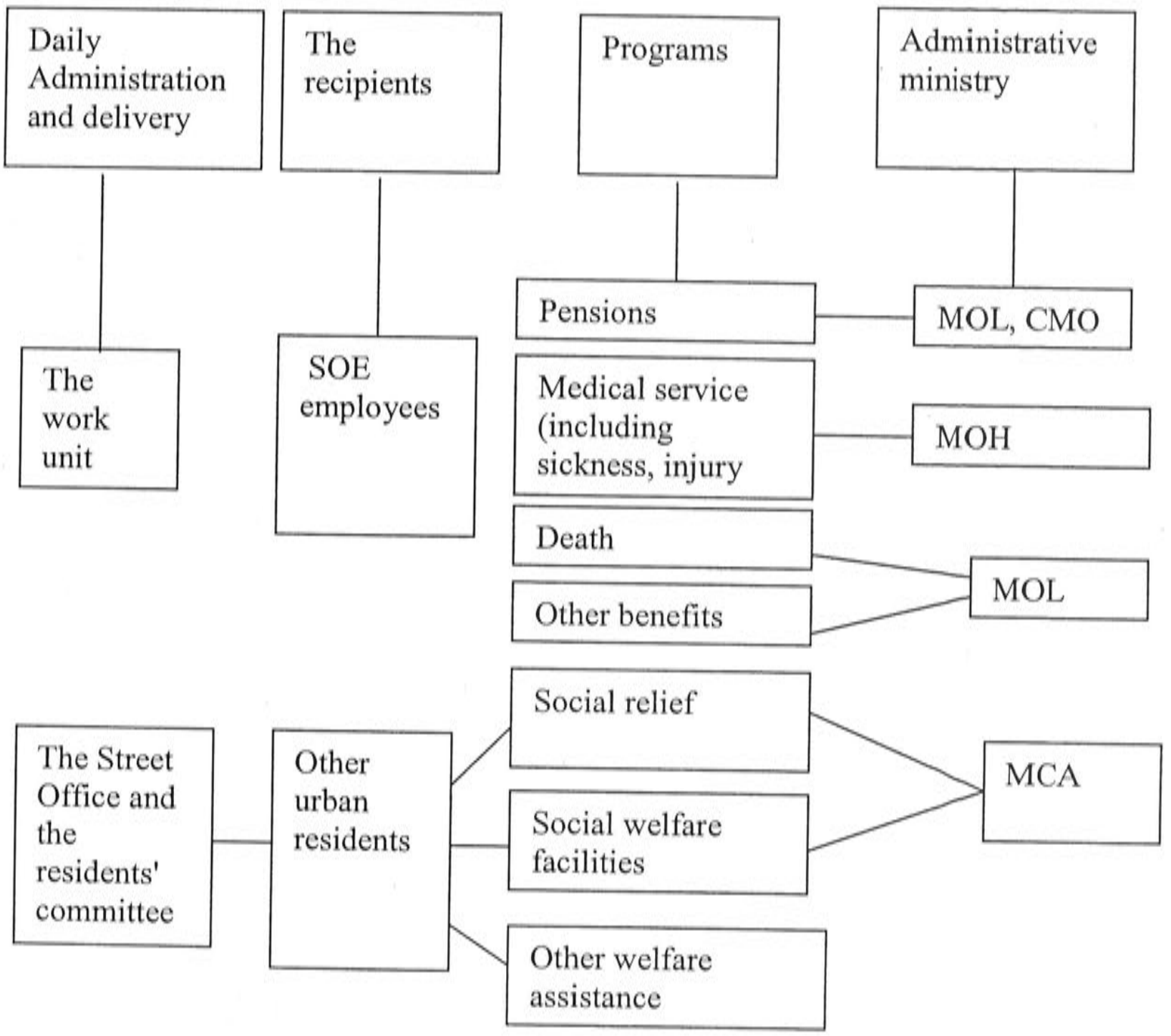


Figure 3-4. The Administrative Structure of the Social Welfare Programs in Urban China (as of at the end of 1970s)



Note: MOL—the Ministry of Labour, CMO—the Central Ministry of Organization, MOH—the Ministry of Health, MCA—the Ministry of Civil Affairs.
Source: author's construction based on Shao and Chen (1991:74).

Table 3-1. Share of Urban Population in Chines Population (%)

Year	1949	1952	1957	1960	1965	1975	1976	1977	1978
Share of urban population (%)	10.6	12.5	15.4	19.7*	18.0	17.3	17.4	17.6	17.9

Source: Based on SSB (1999). * indicates the highest urban population ratio during the 1949-1978 period.

Table 3-2. Comparison of Annual Average Wages of Staff and Workers in the State and Collective Sector (unit: current yuan)

Year	1952	1957	1962	1965	1970	1975	1978	1980
State sector (1)	446	637	592	652	609	613	644	803
Collective sector (2)	348	571	405	398	405	453	506	623
(2)/(1) (%)	78	89	68	61	67	74	79	78

Source: author's calculation based on figures in SSB (2000a: 33).

Table 3-3. The Coverage and Expenses of Labour Insurance Benefits of State-owned Units (selected years) (unit: current yuan)

Year	Urban population (million)	% of total population	State-owned unit employees (million)	% of urban employment	Average monthly wage	Labour insurance and welfare expenditure[a] (billion yuan)	Proportion to total wage bill (%)
1952	71.63	12.5	15.80	63.0	37.17	0.95	14.0
1957	99.49	15.4	24.51	76.5	53.08	2.79	17.9
1962	116.59	17.3	33.09	72.9	49.33	2.82	13.2
1978	172.45	17.9	74.51	78.3	53.67	6.69	14.3
1979	184.95	19.0	76.93	76.9	58.75	9.21	17.4
1980	191.40	19.4	80.19	76.2	66.92	11.60	18.4
1981	201.71	20.2	83.72	75.7	67.67	13.24	20.0

Note: a. This expenditure includes expenses paid by enterprise, institutions and government organs for medical care, extra allowances for living expenses, expenses on recreation activities, sports and propaganda, etc, including pensions, funeral expenses and pensions for the family of the deceased.
Source: author's calculation based on SSB (1981: 105, 107, 435-37), SSB (2000a).

Table 3-4. Welfare Programs Stipulated in the Labour Insurance Regulations

Program	Qualification and Benefits	Duration
Old age	**Retirement age**[a]: (1) male aged 60, female workers aged 50, female staff aged 55, plus at least ten years of continues service; (2) male aged 50; female aged 45, plus at least 10 years of continuous service, fully invalid with medical certificate. **Exceptions:** retirement was permitted due to both work and non-work related health problems. **Pensions:** For retirees, pensions were 60-90% of the salary, depending on the time of joining the revolution led by the CCP (minimum pension was 25 *yuan*/month[59]). Note: outstanding employees' pensions can be 5-15% higher but not more than the pre-retirement salary. The minimum pension was 20 *yuan*. **Settlement assistance for settling in different places:** (1) settlement allowance. (2) transportation assistance for employees and their direct dependants **Medical expenses:** free medical services as those who were working	Until death
Maternity benefit	**Normal**: 56-day leave, 100% salary **Miscarriage**: less than 30-day leave, 100% salary **Twins or complications at birth**: 70-day leave, 100% salary **Unable to work after leave**: sickness leave **Lump sum maternity allowance** for female staff or wives of male staff on giving birth: 1 child- 4 yuan; twins or more-8 yuan per child	
Work related injury, invalidity	**All relevant medical expenses;** **100% salary** **Disability allowance** due to work related disability (for staffs who returned to work after injury): subsidies to the after -injury salary if it was lower than the previous salary due to the invalidity.	During treatment
	Early retirement pensions due to work related invalidity: 60% or 70% of the salary depending on whether nursing assistance was required for daily life.	Until death
Sickness, non-work injury and invalidity	**Medical expenses** covered examination, treatment, operation, hospital, and ordinary drugs.	
	Salary for duration of sickness or injury leave less than 6 months (% of salary): 60-100% depending on the length of service.	Up to six months
	Sickness or non-work related injury relief for duration of medical treatment more than 6 months: 40-60% of the staff's salary depending on the length of service, but not lower than 40% of the unit average salary	Until certified as invalid, or dead, or recovered
	Non-work related invalidity relief: 40% or 50% of the salary depending on whether nursing assistance was required for daily life	Until work capability recovered, or death

Program	Qualifications and benefits	Duration
Sickness, non-work injury and invalidity	**Living stipend after resignation from the job due to health problem:** 40% of salary; (minimum 20 *yuan*) **Free medical services.**	Until death
Death	**Death due to work responsibilities, or after work-related invalidity:** Funeral assistance: 3-month unit average salary; Pensions for direct dependants (monthly payment as % of the deceased salary): 25-50% depending on the number of dependants.	Until they no longer qualified as direct dependants
	Death due to non-work related reasons: Funeral expense: 2-month unit average salary Pensions for direct dependants (once off payment): 6-12 months of the deceased salary	Once for all payment
	Funeral expense subsidy to the employees for the death of direct dependants (lump sum payment): 1/3-1/2 unit average monthly salary depending on the age of the deceased dependant;	
	Death of the retired (resigned) former employees: Funeral expense of 50-100 yuan, determined by the unit; Lump sum payment to direct dependants: 6-9 months pensions of the deceased, depending on the number of dependants.	
Paid home leave	**2-3 week fully paid home leave** every year for qualified employees Note: transportation assistance might be granted for employees who had financial hardships	
Collective welfare provisions	The unit should set up convalescent hospital, rest home, nutrition canteen, and kindergarten (or nursing room). Subsidies for food and drink costs at convalescent hospital, rest room, nutrition canteen (up to one-half of the costs) and kindergarten (up to one-third of the costs) were available for individuals with economic difficulties.	

Note: **a**. Retirement age was different for workers who worked in unfavourable conditions such as: (1) high or low temperature, (2) some chemical industry that may directly affect health. The retirement age for male workers was 55 years old, and that for female workers was 45 years old. 1 year of service in category (1) conditions above was equivalent to 1.25 years of ordinary service year; 1 year of service in category (2) conditions above was equivalent to 1.5 years of ordinary service year.
b. There were regulations for temporary, seasonal workers and workers on probation, and the benefits were in general inferior to those listed in this table.
Source: author's construction based on documents compiled in Wang (ed.)(1989: 488-536), Shao and Chen (1991).

[59] For reference, in 1978, the official exchange rate between Chinese yuan and US dollar was: 1.70 yuan=1 U.S. dollar (IMF 1983). Per capita income in China was 314 yuan/person (SSB 1981).

Table 3-5. Urban Employees' Family Budgetary Expenditure in Selected Years

Year	1957	1964	1981	1982
Number of households	5.3	3.5	8.7	9.0
Family size	4.4	5.3	4.2	4.1
Total annual expenditure (current yuan)	222	220.9	456.8	471
Food	129.7	130.7	258.8	276.2
	(58%)	(59%)	(57%)	(59%)
Clothes	26.6	24.2	67.6	67.7
	(12%)	(11%)	(15%)	(14%)
Fuel	8.6	9.4	8.9	8.8
	(4%)	(4%)	(2%)	(2%)
Rent	5.2	5.8	6.4	7.1
	(2%)	(6.4%)	(1%)	(2%)
Electricity and water	3.2	3.8	4.4	5.0
	(1%)	(2%)	(1%)	(1%)
Medical service	4.1	4.1	2.8	2.9
	(2%)	(2%)	(1%)	(1%)
Childcare	2.9	3.5	2.8	2.8
	(1%)	(2%)	(1%)	(1%)

Note: number in bracket is the proportion in total expenditure, they do not add up to 100 per cent since some of the expenditures are not listed here.
Source: author's construction based on SSB (1984).

Table 3-6. Fringe Benefits and Informal Welfare Benefits to Employees in the State-owned Sector in 1978

Fringe benefit item	Housing subsidy	Price subsidy	Collective welfare facilities	Hardship allowance	Cultural, sports and propaganda	Others	Total
Total expenditure on Fringe benefit (million yuan)	4715	1114	870	600	260	440	7739
Average benefit per employee (yuan/employee)	63.28	6.46[a]	11.68	8.05	3.49	5.91	99.87

Note: a. This number is the average subsidy per urban person, which under estimates the magnitude of the subsidy for each employee.
Source: housing subsidy figures are from Wang (1991:109); Price subsidy figures are from Lou (2000: 154); Other figures are from SSB (1989: 12, 372-73), the number of state sector employees was 74.51 million by the end of 1978 (SSB, 1989).

Table 3-7. Social Welfare Facilities in Urban China (1978)

Social welfare home [a]	Number of homes	577
	Number of member (1000)	38.5
	Expenditure per person (current yuan)	553
Children home [a]	Number of homes	49
	Number of member (1000)	3.7
	Expenditure per person (current yuan)	813
Mental home [a]	Number of homes	102
	Number of member (1000)	15.3
	Expenditure per person (current yuan)	N/a
Welfare factories [b]	Number of factories	920
	Number of disabled peoples in the factories (1000)	34.5
	Profit per person [c] (current yuan)	540.9

Note: a. the numbers included those facilities established and ran by the MCA and by the work units. Therefore, the expenditures came from both the MCA budget and the work units.
b. the welfare factories included those both in rural and urban areas, but most of them were in the cities;
c. the profit per person is averaged over the total number of employees in the welfare factories, not just the number of disabled workers.
Source: MCA (2000, 119-20); SSB (1985b: 130).

Chapter 4. Social Insurance and the Transition Economy—Reforms of Urban Social Security System in China during the 1980s and 1990s

4.1 Introduction

Economic reform since 1978 has changed the basic resource allocation mechanism in China. In particular, the role of government in decision-making and resource allocation has been dramatically reduced. The economic transition has challenged the Chinese social security system.

The whole social security system has to be reformed, in particular, the pre-reform work unit[1]-based system, operated according to the Labour Insurance Regulations (LIR)[2]. The LIR applied to employees of SOEs; however, other state-owned work units and large collective firms had very similar system, although small collective work units had far less generous programs. This chapter focuses on the reform of social insurance programs of the LIR[3]; accordingly, the phrase 'SOEs' is used to replace 'work unit'.

By the time economic reform began in 1978, the social insurance programs included in the LIR were operated at the individual SOE level, and in principle, the programs were financed by the SOE's current operating surpluses. Effectively, the government supported these programs by subsidizing SOEs that made losses.

The economic reforms changed two important aspects of the environment where the LIR was operated. The first aspect was that the previous policy of subsidizing industrialization by taxing the agriculture sector was abolished. The old People's Commune system had collapsed by the mid-1980s. Market trades and prices replaced the previous state monopoly of purchasing and marketing of agricultural products. These changes implied that the state's control and the state's capacity of mobilizing resources from the agriculture to the industrial sector by mandatory economic plan were

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[1] As explained in Chapter 3, work unit is the general phrase for any organization, including SOEs, which employed urban residents in China.
[2] Chapter 3 discusses the details of the LIR and how it was operated.
[3] The next chapter examines the reform of the social relief program administered by the Ministry of Civil Affairs (MCA).

significantly reduced. As a result, it became increasingly difficult for the central government to subsidize SOEs[4].

The second aspect of the changing environment was the continuous SOE reform started from the early 1980s. This reform experienced several stages, aiming at improving the economic efficiency of SOEs, and eventually transforming SOEs into independent economic agents in a market economy to compete with other firms[5]. These reform targets obviously clashed with the old, SOE-based social security system.

During the economic transition, this 'SOE security system' had three major problems:

1. As an insurance system, it lacked diversifications of risks. The SOE-based insurance could not share risks among a large population. This reduced the effectiveness of the system. For example, SOEs with a high retiree/employee ratio had a higher pension burden, while those with lots of female employees had to pay more for maternity benefits. In the extreme case, employees of a bankrupt SOE could lose both their jobs and other social insurance benefits.

2. As a social security program, the scheme had shrinking coverage of urban employees, when the private sector was emerging but left out of the mandatory coverage of the scheme;

3. The system prevented efficient specification of functions because each SOE had to be:
    a. A production-based firm;
    b. An insurance company;
    c. A superannuation fund.

The first two problems affected the effectiveness of providing an adequate social safety net for people in need, while the third prevented SOEs from becoming independent firms in a market economy.

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[4] Wang and Hu (2001) have an interesting discussion with regard to the declining state fiscal capacity in China since the economic reform.

[5] The SOE reforms in China have been well documented, for example, Dong and Tang (et al.) (eds.) (1995), Walder (ed.) (1996), Hay and Morris (et al.)(1994) and Gao (1999).

There are several factors to be considered for a new social insurance system to replace the LIR:

(1) How to define people in need, and how much support the government should provide;
(2) How to design the system so that its inefficiency impact is minimised;
(3) How to transfer from the old to the new system with the minimum cost;
(4) How to design the new system so that the efficiency loss is minimized while providing a given level of social security.

Both this and the next chapter examine the first two issues in the light of the major social security reforms in urban China during the 1980s and 1990s. These two chapters will describe the actual reforms related to the first two issues. Chapters 6 and 7 then look at questions three and four, from a more theoretical point of view.

This chapter is composed of six parts. Each part is one of the programs in the LIR system, except for the next part, which looks at the new unemployment insurance. Parts three and four examine the old age pension and medical care reform, respectively. A brief discussion of reforms in maternity insurance and occupational injury insurance follows in part five. The last part summarizes the chapter.

4.2 The Unemployment Insurance Reform

4.2.1 Background of the Reform

The first unemployment insurance program in China, since the start of the communist regime, was implemented between 1950 and 1957, and provided grain and other relief for four million unemployed workers. In 1957, the Chinese government announced the eradication of unemployment in socialist China, and abolished this unemployment insurance program (Wang, Liu et al. 1998). From then until the economic reform, the most fundamental form of social security for urban residents was employment security. The government guaranteed jobs for almost all working age urban individuals. With a lifetime employment guarantee, urban residents not only secured stable monetary incomes (salaries), but also received entitlements to other comprehensive benefits such as old age pensions, medical care, free housing and childcare. These welfare benefits

covered both employees of SOEs and their immediate family members, although benefits for the latter were less generous[6].

The labour market and SOE reforms created a few sources of unemployment in urban China:

(1) frictional unemployment for new contract workers between jobs,
(2) employees may lose jobs when the firm became bankrupt; and
(3) laid-off SOE employees who were previously employed under the implicit lifetime contract with the government during the central planning period[7].

Firstly the government job guarantee was abolished during the labour market reforms of the 1980s and 1990s. In 1983, a pilot labour contract scheme was introduced, which required all new employees of state-owned as well as collective firms to sign an employment contract with the employer. This labour contract system was implemented nation-wide in 1986. By 1995, the share of contract workers among total employees of SOEs was 39 per cent, compared with 3.7 per cent in 1985 (Meng 2000). When this labour contract replaced the lifetime job guarantee, unemployment became an inevitable phenomenon of the economy.

Other labour market reforms included relaxing government control of wages, allowing enterprises to decide remuneration for employees, and relaxing restrictions on SOEs' hiring decisions, etc.

Secondly, another reform triggered the establishment of an unemployment insurance scheme. It was the introduction of the bankruptcy law in 1985. Employees of bankrupt firms (including SOEs) could obviously become officially unemployed.

Thirdly, China's economic transition, especially SOE reforms, created another source of unemployment. Following these reforms, excess workers employed by SOEs during the thirty years of central planning could be made redundant. In contrast, before 1978, as a result of the government full-employment target, SOEs had to hire designated

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[6] For details, see the review in Chapter 3 about the social security system in cities during the pre-reform period.
[7] These laid-off workers were dealt with separately, especially between the mid-1990s and 2001. See Text Box 4.1.

employees according to the economic plan[8]. In addition, since these employees were essentially hired with an implicit lifetime contract under the pre-reform labour arrangement, SOEs had not been able to dismiss any workers. It is estimated that SOEs had about 20-30 million excess employees by the late 1990s (Zhou 1998: 69).

4.2.2 Major Reforms of Unemployment Insurance Program

The major reform policies of unemployment insurance during the 1980s and 1990s are listed in Table 4-1. These policies took time to be implemented across the country. They are discussed in the next two sections.

4.2.2.1 Reform Policies in 1986 and 1993

The first reform was the 'Temporary Regulation for SOE Employees Waiting for Jobs"[9], which was issued by the State Council in 1986. The Regulation covered four categories of SOE ex-workers: (1) ex-employees of bankrupt SOEs; (2) retrenched employees from impending bankrupt SOEs; (3) ex-employees of SOEs whose labour contract had expired or had been terminated; (4) workers dismissed by SOEs (Wang, Liu et al. 1998). This reform was to establish a public unemployment insurance scheme that provides some protections for SOE employees who had been made redundant by the introduction of labour contracts and the bankruptcy law (Wang, Liu et al. 1998). However, at the time, it was rare for SOEs to dismiss workers, especially those employed prior to the labour contract system, since they had an implicit lifetime contract.

In 1993, the unemployment insurance program was further reformed according to the 'Stipulation of Insurance for SOE Employees Waiting for Jobs'. This policy extended the coverage of the program by adding three new eligible categories of workers: (1) employees of SOEs dismantled by the government; (2) retrenched employees from SOEs re-structured according to government policies; and (3) other employees of SOEs eligible for unemployment benefit according to law, or other local regulations (Wang, Liu et al. 1998). The first two new categories protected workers when SOEs were

[8] For more details about the full employment target, see Chapter 3.

discontinued for policy reasons, while the last one gave local (municipal and provincial) governments some room to extend the coverage in their administration areas.

According to the 1993 Stipulation, SOEs were required to contribute 1 percent of total wages to the social pool of the unemployment insurance program. The Department of Labour at the city or county level was responsible for the administration of this program. It collected contributions, registered unemployed workers and paid out benefits. Unemployment relief was about 20 to 50 per cent higher than the social relief standard of the city, or the poverty line (Wang, Liu et al. 1998). The duration of unemployment relief depended upon length of employment: for those with less than 5 years of employment, it was up to 12 months; workers with more than 5 years of employment could receive relief for up to 24 months. The unemployment insurance program also provided other benefits: medical care benefits, funeral subsidies and dependant allowances upon the death of the unemployed worker. In addition, it provided other assistances to help the unemployed to find new jobs. The amount of these benefits was left to be determined by the provincial level government (Li and Zhang 2000).

After the 1993 reform, the Chinese unemployment insurance program only covered a few categories of unemployed SOE workers. With the rapid development of the non-publicly owned sector and its rising share in urban employment, the program would only cover a declining share of urban employees. As shown in Table 4-2, from 1980 to 1999, the share of SOE employees in total urban employees declined from 76 to 40 percent. The share of employees in collective work units also dropped from 23 to 8 percent. Equally dramatically, the share of employees in registered work units fell from 99 per cent of all urban employees to only 56 per cent, indicating that a rapidly growing percentage of urban people were either self-employed or in small private firms. With the ongoing economic reform, this trend could be expected to continue. However, the unemployment insurance program left these employees unprotected.

The financing of the program also indicated potential problems. Assuming revenues are only used to pay unemployment relief but not other benefits included in the program,

[9] Prior to 1993, unemployment was not officially acknowledged in China, but was called 'waiting for jobs' (Editorial Board 1999).

the break-even condition for the financial viability of an unemployment insurance scheme is show in equation (4-1):

$$\frac{C}{W} = \frac{B}{W} * \frac{U}{N} \tag{4-1}$$

where C is the average contribution per worker (or employer contribution rate as a % of wage bill), W is the average wage, B is the average unemployment relief, U is the number of people unemployed, and N the number of workers, all variables are for a given period[10].

Equation (4-1) can be used to examine the 1986 program, which had contributions of 1 per cent of wages, and benefits of 75 per cent of wages (for up to 24 months). Roughly speaking, the program is only financially viable providing that unemployment rate is not higher than 1.4 per cent. Even after the 1993 reform, with a contribution rate of 1 per cent of payroll, assume that the poverty line was at 20 per cent of average wages, and unemployment benefits was 1.5 times the poverty line, the break-even unemployment rate would only be about 3.3 per cent.

Contributions in the Chinese unemployment insurance program are used to pay more than just unemployment relief. Other benefits, as mentioned previously, included medical care subsidies, funeral subsidies, dependent allowance, etc., as well as administrative costs, training costs and other financial support that would assist with reemployment. In 1990, revenues from contributions were 743 million yuan, and the outlay was only 187 million yuan. Only 6.95 % of the outlay was used to pay unemployment benefits, including relief, medical care, dependent allowance, etc, while administrative costs accounted for more than 33%, reemployment training costs accounted for 34.75%, and the subsidy for self-employed workers used 19.79% of the total outlay (Li and Zhang 2000).

Despite the low break-even unemployment rate, and multiple payments from limited contributions, the program went through the 1980s and the early 1990s with

[10] Revenues of the scheme are C*N, the outlay equals to B*U, the break-even condition is C*N = B*U, which gives equation (4-1).

accumulating (overall) surpluses. In 1986, the program covered 50 million employees but the number of beneficiaries was negligible. There may have been several reasons for this outcome. The first one was that SOE reform had just started and relevant policies, such as bankruptcy law, were not fully in place. Unemployment within SOEs was low. The second possible reason was, as Meng (2000) notices, during the 1990s, most out-of-work SOE employees had been laid off (*xiagang*)[11], as opposed to being dismissed. They therefore continued to receive a living allowance from the (reemployment centre of) SOEs, and were not eligible for unemployment benefits. Finally, it took time for people to become aware of the availability of unemployment insurance and to register as unemployed, rather than 'waiting for jobs'.

4.2.2.2 The Reform in 1999

In 1999, further reforms of the unemployment insurance program were formalized by the policy stipulated in 'The Rule of Unemployment Insurance'. The major reforms included[12]:

a. Coverage of the program was expanded to employees of all urban enterprises and institutions, which included all urban employees except public servants[13].

b. Contribution rate was formally increased to 3 per cent of wage bill[14], which was composed of employer contributions of 2 percent of payroll, and employee contributions of 1 per cent of wages. Provincial governments could adjust contribution rates based on the local job market situation, with the permission of the State Council.

c. Social pooling of unemployment insurance funds was increased from county to city level. The reform also allowed the provincial government to coordinate among cities by forming an adjustment fund, with contributions from funds collected at cities, to pool risk among cities in the province;

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[11] These employees were nominally considered to be temporarily laid off. In reality, this often became permanent. For the arrangement for the laid-off SOE employee, see Text Box 4.1.
[12] Based on Li and Ren (1999).
[13] The reform was yet extended to the public servant sector and therefore they were regarded as permanent employees.
[14] The rate increased since 1998, see Text Box 4.1.

Text Box 4.1 Laid-off Workers and the Transitional Assistance from Reemployment Centres

Laid-off workers of SOEs were called *'xiagang'* in Chinese, meaning they had lost their job positions in SOEs. However, since they were employed prior to the labour contract system, with an implicit contract of lifetime employment, it was difficult to officially dismiss them during the early stages of the SOE reform. They were therefore not officially eligible for unemployment benefits, because in principle, their employers (SOEs) were responsible for their wellbeing. However, since there were no official regulations with regard to these laid-off workers, some of them did not get their wages in full. This caused hardship for them and their families.

When the scale of laid-off workers became large (see the table below), the government implemented a reemployment project to provide financial support for these workers as well as to help them in finding new jobs, by providing training, etc. During the peak period between 1998 and 2000, every SOE with laid-off workers had to establish a reemployment centre to provide these services. To receive the services, laid-off workers had to register at the centre, sign a contract (up to 3 years) promising to officially terminate his/her employment relationship with the SOE when he/she was reemployed, or at the end of the 3-year period. If they were still unemployed after 3 years, they then became eligible for unemployment benefits. The reemployment centre was designed to provide a period of transition from lifetime employment to the labour market. Since 2001, the policy has been: no new reemployment centres, and laid-off workers should terminate their employment relationship with the firm and become eligible for unemployment benefits.

The reemployment centre provided the following services to laid-off workers: (1) a living allowance, which decreased over time, which was higher than the local social relief but lower than unemployment relief; (2) relevant social insurance contributions, and (3) job training and employment information.

Funds needed for the centre came from three sources, with each party contributing roughly 1/3: the SOE, the local government and the unemployment insurance fund (He 2000). For this purpose, the contribution rate for the unemployment insurance program was increased in 1998 to 2% of total wages by employers and 1% of wages by employees. The unemployment insurance fund paid 1.46, 4.09 and 4.9 billion yuan to reemployment centres in the year of 1998, 1999 and 2000, respectively, which accounted for 28, 45 and 40%, respectively, in the total annual outlay of funds.

Number of Retrenched workers of SOEs (by year end)

year	1997	1998	1999	2000	2001
Number of retrenched workers (million persons)[a]	6.3	6.1	6.5	6.6	5.2
Total employees in state-owned work units[b] (millions of persons)	109.5	107.7	88.1	83.3	78.8

Note: a. Figures do not include reemployed retrenched workers.
b. state-owned work units include SOEs and other institutes and organizations.
Source: author's construction based on figures from MOLSS (various years), on line at http://www.molss.gov.cn.tongji/gb

Source: Based on Liu (2000), Wang and Liu (et al.) (1998), and He (2000). Chinese news on the 3rd of January 2001, *Southern Urban Newspaper*

d. Unemployment relief was stipulated to be lower than local minimum wages[15], but higher than the urban local minimum living security (UMLS) line[16]. Details of the relief were determined by the provincial government. The duration of relief no longer

[15] The minimum wage is determined by the provincial government. The relevant regulation was issued in 1993.

[16] The UMLS is a new program of social relief, formally implemented nationally in 1997. It is a guaranteed income for all urban residents, so it is a kind of the city's poverty line. See Chapter 5 for details.

depended on length of employment, but on years of contributions: employees who had contributed for between 1-5 years could receive benefits for up to 12 months. Employees who contributed for between 5 and 10 years could receive benefits for up to 18 months. Employees who contributed for more than 10 years could receive benefits for up to 24 months.

Some features of the 1993 Regulation were maintained in the 1999 Rule:

- Government budgets remained as another source of funds for the program. This showed that the government stood by to bail out the program when necessary;
- Unemployment benefits included more than unemployment relief, such as: a) medical care subsidy; b) funeral subsidy, and a lump sum subsidy for dependants of deceased unemployed workers; and c) subsidy for training and employment services during any unemployed period (Kang and Feng 2000).

4.2.3 Some Comments about the Current Unemployment Insurance Program

Table 4-3 lists some official figures of the unemployment insurance program. They include the coverage, revenues and the outlay of the funds between 1996 and 2000. Nationally, the program appeared to be financially viable: revenues were more than outlays in every year during this period. As a result, the balance of the fund in this program was accumulated. It reached 18.3 billion yuan (current value) in 2000.

However, during this period, the unemployment program did not cover retrenched workers from SOEs (see Text Box 4.1). In 1999 and 2000, this unemployment insurance fund financed one-third of the costs of the separate program, re-employment centres, which supported these retrenched workers, while budgetary appropriations financed the same amount. Table 4-3 clearly indicates that the unemployment program would not have been financially sustainable if it had covered all retrenched workers in cities.

Assuming unemployment relief is 30 per cent of local average wages[17], with a total contribution of 3 per cent of payroll, equation (4-1) indicates the program breaks even when the unemployment rate is 10 per cent, providing all revenues are used to pay unemployment relief only. However, since unemployment benefits also include other payments, such as medical care and training subsidies, the actual unemployment rate that can be supported is much lower than 10 per cent.

In 1999, the official figure of workers who had been temporarily laid off was about 10 million people and, together with the official unemployment figure of 5.4 million people, this represented an unemployment rate of 6.8 per cent in urban China (SSB 2000a). However, the actual unemployment rate is often higher than the official figures indicate. For example, Li and Zhang (2000) estimate the urban unemployment rate (including retrenched workers) was about 9.4% in 1998.

High unemployment rates in urban China may continue for an extended period of time for several reasons. First, the large-scale laid-off of workers will continue for some time. Second, the jobs of contract workers, and employees in the more flexible labour market, such as those in joint ventures and private firms, are more often affected by business fluctuations. Third, the benefits of the program are generous, in that it provides not only unemployment relief, but also other benefits. A relatively generous unemployment insurance program may provide a disincentive for active job searching, which tends to keep the unemployment rate higher then otherwise.

Another issue facing the current program is its social pooling level. Funds are collected and pooled at the municipal level, with a provincial adjustment fund. There are problems associated with this pooling. The first being whether the pool is large enough to share the unemployment risk. When a city is shocked by an economic downturn, fund revenue will shrink, but outlay will rise, generating financial pressure on the program. The second is related to labour mobility. A city's unemployment insurance program covers local residents only, that is, residents with the local household registration[18].

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[17] Author's calculation based on the MLS line in provincial capital cities in 2000 shows that the MLS line is about 25% of the provincial averages. Assume the unemployment relief is 5% higher than the MLS line.

[18] This is a system that registers every resident according to residential location. The system is rigid with regard to changing residential areas. See details in Chapter 3.

Since unemployment benefits also depend upon the number of years of contribution to the municipal fund, people who move to work in another city will have to have their contributions (both employer and employee) transferred from the original city fund to the new city. While in principal, there is no barrier to doing so, in practice, the original city may be unwilling to give up the accumulated contributions and the new city of proposed residence may be reluctant to accept the unemployment liabilities associated with new immigrants. In such cases, the costs of bureaucratic bargaining may greatly inhibit labour mobility.

4.3 The Old Age Pension System

4.3.1 Background of Pension Reforms

The old age pension program was part of the LIR during the pre-reform period. By the late 1970s, the program had evolved into an individual-SOE based, 'pay-as-you-go' (PAYGO) system where SOEs payed pensions to their retirees from current operating surplus. During the central planning period, this SOE-operated pension scheme was in fact a social insurance program, since the government always subsidized SOEs that made losses.

With the economic reform, this work unit-based pension system faced several problems. As mentioned in the Introduction to this chapter, there was a lack of risk sharing; the scheme had shrinking coverage as a social security program; and there was also a lack of specification of functions for SOEs.

In reality, the first problem was shown as the imbalanced pension burden among 'old' and 'young' SOEs, as the former had high retiree-worker ratios, while the latter had low ratios. This triggered the initial reform of social pooling of pension funds among SOEs (Han and Jiao 1997; He 2000; Li 2000) (see Table 4-4).

The second problem was that a rising share of urban employees was left out of this SOE-based pension program, due to the changing employment structure in cities (see Table 4-2). Moreover, this change of employment structure was accompanied by increased retiree/worker ratios in the public sector. Table 4-5 lists retiree/employee

ratios in urban China by ownership for selected years in the 1980s and 1990s. The overall retiree/employee ratio in urban China rose during this period, from 0.1 in 1980 to 0.3 in 1998. This increase was mainly due to the rising retiree/worker ratios in the state-owned and collective work units, while in the other ownership sector, the ratio fluctuated during the period. More importantly, Table 4-5 shows that the ratio in the latter is much lower than that in the former.

This observation reflects that both the economic transition and emerging private sector in urban China eroded the old PAYGO system. Since the old PAYGO scheme only covered employees in SOEs, old people had an incentive to stay in SOEs to receive pensions. However, once the scope of mobility was created by the new private sector, the young people had an incentive to move into private firms, so as to avoid having to pay for the pensions of the old. The nature of a PAYGO pension scheme is that it is only stable if it is centrally enforced by regulations.

This problem of the old PAYGO pension scheme indicated that the social pooling of pension funds among SOEs was unsustainable. This accelerated the need for further pension reforms. As shown in Table 4-4, Chinese pension reforms moved towards a three-pillar pension system, with the (targeted) coverage that includes all urban employees.

4.3.2 The Pension Reform

The government approach to the problems of the old pension scheme was a series of passive responses to pending financial pressure. All formal reforms were implemented after experiments in pilot cities. The major reforms included: (1) in 1984, the social pooling of pension funds among SOEs was established at the city's level; (2) in 1986, the government established a funded pension scheme for the new contract workers of SOEs; (3) in 1991, all employees in SOEs were required to contribute to pension funds; (4) in 1993, a pilot project was launched to reform pension benefits; (5) in 1995, the government initiated a 'three-pillar' pension scheme, which was composed of a scaled-down PAYGO system that provided a universal elementary pensions to all employees (the first pillar); a compulsory individual account system that provided individual account pensions (the second pillar), and enterprise supplementary pensions that based

on voluntary contributions (the third pillar). This reform was carried out in many different ways in cities and counties in China, with the guideline of the two alternative implementation methods (see Text Box 4.2); (6) in 1997, a new reform was started aiming at unifying various pension schemes within a given province into one scheme at the province level. These reforms are briefly listed in Table 4-4 and are discussed as follows.

4.3.2.1 Social Pooling of Pension Funds of SOEs

When some SOEs found it difficult to pay pensions to their retirees, pooling pension funds of all SOEs seemed to be an obvious solution to this problem. In principle, as long as the whole public sector could afford to pay pensions to its retirees, pooling funds could solve the financial problem of the old PAYGO pension scheme.

This reform began in 1984 as a pilot project in a few cities and counties (White and Shang 1996). The social pool was administered by the local government social insurance bureau. It collected contributions from local SOEs according to a unified rate[19], and then distributed funds backs to each SOE according to its pension liabilities[20] (Wang, Liu et al. 1998).

Social pooling of pension funds was later promoted across the country. By the end of 1987, 67% of all cities and counties had established a pooled pension fund; by the end of 1991, 82 per cent of employees and 95 per cent of retirees in SOEs had been covered by a local pooled pension fund. By 1995, 13 of 31 provinces (including the central government administered cities: Beijing, Shanghai and Tianjin) had established a social pooling fund at the province level (Han and Jiao 1997).

4.3.2.2 A Separate Public Pension Fund for Contract Workers

Along with the introduction of the labour contract system in 1986, a pension scheme was set up for new contract employees of SOEs, which was initially separated from the scheme of permanent workers. According to the document 'Temporary Regulation of

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[19] It is not clear how the rate was determined. Presumably, the local social insurance bureau calculated the contribution rate as: (pension payment of SOEs + administration costs)/total payroll of SOEs.
[20] At the time, retirees of SOEs still received their pensions from their work unit. Later on, pensions were paid from the local social security bureau.

Implementing Labour Contract in SOEs' issued in that year, SOEs that employed contract workers were required to contribute 15 per cent of these workers' total wages, while individual contract workers were required to contribute 3 per cent of the standard wage[21]. All contributions were accumulated in a 'special account of pension funds', which was administered by the local government social security agency. These funds were separated from the social pool of pension contributions for permeant workers. The document also specified that future pensions of contract workers would depend upon contribution years, the amount of contributions, and the average wage during employment[22] (Chow and Xu 2001).

By the end of 1991, the accumulated pension funds for contract workers were almost 7 billion yuan (current value), which was equivalent to 15 per cent of total pension payments that year (Li and Zhang 2000).

After this reform, there were two systems in SOEs: a PAYGO system for permanent workers, and a funded system for contract workers. The accumulated funds were actually pooled and managed by the government agency. The funds could only be put in the sate-owned bank and the return was the same as the bank interest rate for private savings account[23].

During further reforms after 1991, the pension scheme of contract workers and that of permanent workers were gradually merged into the new, three-pillar scheme. Pension funds accumulated for contract workers were pooled together with social pooling funds of permanent workers, which were often used to pay pensions to current retirees.

The significance of the pension scheme for contract workers was that it introduced employee contributions to pension funds, and the idea that future pension benefits would be linked to contributions. Another consequence of this scheme for contract workers, which most literature ignores, was its implications for future pension reforms. The dual-pension scheme required contributions for both current retirees of the old

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[21] The national regulation allowed the local government to determine the employee contribution rate, with a maximum of 3 per cent of standard wages.
[22] The details of how to determined future pensions are not clear.
[23] Han and Jiao (1997) mention that the scheme was funded and there were individual accounts for contract workers. However, neither other literature, nor the government document mentions individual accounts.

PAYGO system and for future pensions of the funded system for new contract workers. The high contribution rates appeared to be difficult to sustain (Han and Jiao 1997). This, perhaps, contributed later to the choice of a partially funded pension scheme as the new pension system in urban China.

4.3.2.3 Employee Contribution of All Employees

In 1991, all employees of SOEs were required to contribute to the social pooling fund. In the beginning, the contribution rate was 3 per cent or less of wages[24], and the rate was expected to rise over time (Han and Jiao 1997). A second part of this reform was that pension funds of contract workers were combined with the social pooling funds of permanent workers to pay the pensions of retirees (Han and Jiao 1997).

After this reform, the pension system of SOEs was still a PAYGO scheme. Each county or city had a social pooling fund, which was composed of the following parts: (1) permanent employee contributions of 3% (or less)[25] of wages; (2) accumulated and current contract employee contributions of 3% of wages; (3) employer contributions of 15% of contract employees' total wages; and (4) employer contributions of a certain percentage of permanent employees' payroll, as specified by the local government social insurance department. Since most present retirees were ex-permanent employees, pension benefits followed the rules of the LIR[26].

Neither the reform of pooling pension funds nor the reform of employee contributions could solve the intrinsic problem of the old PAYGO pension system discussed previously. The present and expected financial pressure of the PAYGO system eventually pushed the reform to move forward.

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[24] See footnote 20.
[25] See footnote 20.
[26] In the LIR, pensions are paid as a proportion of pre-retirement wages, with the proportion depending on the length of employment. See Chapter 3 for details.

4.3.2.4 Reforming Pension Benefits—Pilot Projects

In 1993, pilot projects were launched by the Ministry of Labour[27] to reform pension benefits. In the new system, pension benefits were composed of two parts: social pensions and contribution pensions (Han and Jiao 1997).

The social pensions were set as 15-25% of local average wages during the year before retirement. The exact proportion within this range depended on length of contribution:

5-10 years of contribution—15%;
10-15 years of contribution—20%;
>15 years of contribution—25%.

The contribution pensions depended on the ratio of individual wages to local average wages, as well as on contribution years as expressed in the following formula:

$$CP = (\sum_{1}^{T} \frac{w_t}{\overline{W_t}} * \frac{1}{T}) * \overline{W} * T * 1\% \qquad (4\text{-}2)$$

where CP represents the contribution pension, w_t is individual wage in year t, $\overline{W_t}$ is local average wage in year t, T is total contribution years, $\overline{W}$ is the local average wage during the year prior to retirement.

This new pension payment system established a partial linkage between benefits and contributions, since social pensions related benefits to contribution years, while contribution benefits related benefits to both contribution years and the individual's wage rank. However, the link between pension benefits and contributions was indirect, and the relationship between contribution and future pension benefits was not clear.

4.3.2.5 Establishing a Three-Pillar, Partially Funded Pension Scheme, with an Individual Account for All Urban Employees

In 1995, the government decided to reform pensions into a three-pillar scheme, with a partially funded program that covered all urban employees, with individual accounts.

The three-pillars were: (1) a scaled-down PAYGO component to pay elementary pensions to all retirees with contributions of 15 years or longer; (2) a compulsory, fully funded component using individual accounts to accumulated individual account pensions and (3) voluntary enterprise supplementary pensions. Among the three pillars, the third pillar is still undergoing pilot projects in the country and therefore no national regulations have been formalises. Major reforms have focused on the first two pillars.

Text Box 4.2 Two Implementation Schemes of the Reform in 1995

Method 1 was clearer and simple, with a 'large' individual account, with about 16% of wages as contribution. Both employer and employee contributions were put into an individual account, with employer contribution declining over time, while employee contribution rising:

Initial contribution: employer—13% of wages (8% of individual wages + 5% of local average Wages);
employee—3% of wages.
Target contribution: employer—8% of wages (3% of individual wages + 5% of local average Wages);
employee—8% of wages.

Pension benefits: retirees were eligible for a pension if had more than 15 years of contribution. The monthly pension was set as a percentage of funds accumulated in the individual account, depended on the expected average years of life after retirement. Pensions for current retirees and workers employed prior to this pension reform were calculated in other ways.

Method 2 included a social pooling fund contributed by employers (contribution rate was not clear), which was used to pay a minimum pension (25% local average wages) for employees with at least 15 years of contribution. Pensions also included an individual account pension, which depends on the balance in the account and the life expectancy at retirement. Pensions for current retirees and for workers employed before this pension reform were calculated in other ways.

This method did not clearly specify the contribution rate or the size of the individual account. In practice, it formed two different methods: Method 2A and Method 2B.

	2A	2B
Initial contribution	Employer: 0 Employee: 3% of wages	Employer: 7% of wages Employee: 3% of wages
Target contribution	Employer: 2% of wages Employee: 8% of wages	Employer: 2% of wages Employee: 8% of wages

Source: based on Han and Jiao (1997).

Unsure as to the best way to carry out the reform, the government issued two alternative implementation methods for provinces and cities to choose between (see Text Box 4.2). The government did not specify details of the reform; instead, it left scope for cities and provinces to design the reform according to their local conditions. This led to many different forms of pension systems in cities and provinces. Most of them operated at a

[27] The Ministry of Labour was the predecessor of the Ministry of Labour and Social Security (MOLSS).

county or city level, comprised of a social pooling funds (PAYGO) at that level to pay the elementary pensions, and a fully funded individual account system to pay individual account pensions (Zhang, Huang et al. 1998).

A pension program operating at a county or city level had two potential problems:

- The social pool was too small to provide adequate risk sharing;
- It created barriers to labour mobility. Different contribution rates, and different benefits made it very difficult to have pension contributions transferred with individual workers. This meant they would incur an extra cost of moving to another social pooling area.

Soon after the reform in 1995, the government issued another reform policy to unify pension schemes within provinces.

4.3.2.6 Unifying Pension Programs within Provinces

In 1997, the State Council issued another pension reform document, the 'State Council Decision of Establishing a Unified Basic Pension System for Enterprises'. This document retained some features of the 1995 reform, especially those of the first two pillars of the pension system. It focused on unifying regulations on public pensions within provinces in terms of employer and employee contribution, the size of individual account, rules with regard to the management of individual accounts, and pension benefits. In particular, the reform required that the social pooling of pension fund to be shifted from municipal or county governments to provincial governments. However, it left some room for provincial governments in determining details of the program, for example, the contribution rate. The Decision also required the coverage of the pension program to be extended to all urban employees gradually, including self-employed[28]. The rules of the 1997 Decision shaped the main features of the current (as in 2002) urban pension system in China. These features are discussed as follows using a general case as an example, ignoring any provincial differences in details. .

[28] The following discussion about the 1997 Decision is based on Han and Jiao (1997); Wang and Liu (et al., eds) (1998).

The first pillar of elementary pensions operates on a PAYGO basis. The funds come from employer contributions. Initially, employers contributed about 13% of total wages in 1997. The contribution rate rose by 1% every other year from 1998, and it will eventually reach about 17%. The elementary pensions are paid to retirees with at least 15 years[29] of contribution. The amount is 20% of provincial average wages of the year prior to retirement.

The second pillar of individual account pensions is designed to be fully funded. Funds in individual accounts come from both employer and employee contribution, with the total of 11% of wages. Employees contributed 4% of wages initially in 1997. The employee contribution rate then rose by 1% every two years from 1998. It will eventually reach 8%. Accordingly, employers contributed 7% of wages into individual accounts in 1997. The employer contribution rate started to decrease by 1% every other year from 1998 and it will finally drop tp 3%. Retirees who contribute for more than 15 years receive a monthly individual account pension that equal to 1/120 of total funds in the individual account at retirement. Other retirees receive all accumulated funds (including credited interest) as a lump sum upon retirement.

The management of individual account follows the following rules:

- Funds in individual accounts are accumulated to pay pensions only, and could not be withdrawn beforehand;
- Funds accumulated in individual accounts can only be used to invest in bank accounts in state-owned banks and government bonds;
- The return on funds in individual accounts is credited annually, at the rate determined by the provincial government. The rate is based on bank deposit rates and the government bond rate;
- Individual accounts (including both employee and employer contributions) are portable when employees change jobs.
- Employee contributions in the account can be inherited when the employee/retiree dies.

[29] This included years of employment that was acknowledged according to the government rules, which may or may not be equal to the actual working years of the individual (Liu 2000) (ed.).

The first pillar of elementary pensions and the second pillar of individual account pensions together form the so-called 'basic pensions'. The basic pensions are partially indexed to the growth of average wages annually, with the degree of indexation varying between 40% and 80% (Han and Jiao 1997). The basic pensions are payable to all new retirees after the 1997 reform, who are referred as the 'new people' of the three-pillar pension system. Those who retired before 1997, the 'old people', receive pensions according to the pre-reform arrangement stipulated in the LIR. Their pensions are adjusted according to the growth rate of average wages, as for the 'new people'. The 'middle people', that is those whose employment period crossed pension reforms[30], have basic pensions specified by the following formula:

Basic pensions of the 'middle people' = elementary pensions + individual account pensions + transitory pensions

where the first two parts were the same as for the 'new people', while the transitory pensions was designed to make up for the difference of contribution rate into individual account before and after the pension reform[31].

The major reforms in 1997 were aimed at building up a unified public pension scheme that would cover all urban workers within provinces. Once completed, these reforms would increase risk sharing and reduce barriers to labour mobility, at least within each province.

However, the current, provincially unified scheme has its own problems. The most significant of these is that the government seems to want to use this scheme to meet both the short run and the long run costs of the program (Han and Jiao 1997; Li 1998). In the short run, the main cost is the pension liability of the previous PAYGO system, that is, pensions of current retirees. However, it is not clear in the reform how theses liabilities are financed. If the government wants to rely on the social pooling fund, which will increase over time, as employer contribution rates rise from about 13% in 1997, to 17% of payrolls, this does not seem to be adequate for the reasons set out below.

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[30] The criterion is different for cities/counties that chose different implementation methods in the reform of 1995 (Han and Jiao 1997).

In the short run, the scheme has to pay pensions to current retirees whose pensions follow the pre-reform rules. To finance a pension scheme on a PAYGO basis, for a fixed replacement rate (pension/wage ratio), the fund is financially viable if the following condition holds:

$$t = \frac{P}{W} * \frac{N_R}{N_W} \qquad (4\text{-}3)$$

where P is average pensions, W is average wages, P/W is aggregate replacement rate; N_R is number of retirees, while N_W is number of workers, t is the contribution rate (as a percentage of total wages).

Using equation (4-3), the current social pooling contribution rate does not appear to be adequate to pay pensions of current retirees. For example, in 1998, the retiree/employee ratio reached 0.29 (Table 4-5), while the aggregate replacement rate that year was 80%. The social pooling contribution rate therefore needed to be 23.2% to collect just enough contributions for pension payments. In fact, the shortage of funds has led to a few problems, such as demand for government budgetary appropriations for pension payment[32], defaults on pension payments[33], as well as the so-called 'notional individual account' problem[34].

In the longer run, even though China is facing an aging population (see details in Chapter 6), when the middle people and new people of the pension program start to retire, the social pooling seems to be too large for what it claims to pay. Using equation (4-3), a 17% employer contribution of payroll would be enough to pay elementary pensions of 20% average wages for a retiree/employee ratio up to 0.85. This indicates

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[31] Cities and counties had different formulas of calculating pensions for the middle people.

[32] For example, in 1999, 17.9 billion yuan were appropriated into social pooling fund to pay pensions (source: author's discussion with ex-MOLSS employees), which was about 7% of pension payments that year.

[33] For instance, in 2000, pension funds paid 166.8 billion yuan for current period pensions, and more than 10 billion yuan of default pensions from previous years. However, there was a new default of pension payment of 3.9 billion yuan that year (source: author's discussion with ex-MOLSS employees).

[34] This refers to the situation where funds in individual accounts are used to pay pensions to current retirees, with/out regulations. During the first three years after the 1997 reform, about 199 billion yuan in individual accounts were used to pay pensions (He 2000). There will be additional discussions about notional accounts in Chapter 7.

that this defined-contribution (and also defined-benefits) PAYGO scheme can collect sufficient contributions to pay the defined benefits for a very 'old' population, where every five workers have to support four retirees. Problems of the social pooling in the current pension scheme will be discussed in details in Chapter 7.

4.4 Medical Care Insurance Reform

4.4.1 Background of Medical Care Insurance Reform in Urban China

Medical care insurance was one of the major programs of the pre-reform social security system in China. In cities, it was composed of the 'Labour Insurance Medical Care System' and the 'Public Medical Care System'[35]. The former applied to employees in SOEs, while the latter applied to employees in all government institutions, including schools, research institutes and government organs. Both programs provided nearly free medical care for employees, and partly free medical care for their family members.

The medical care insurance system was also SOE-based and operated in a similar way to the pension scheme at the time: medical care payments were paid by individual SOEs out of current operating surplus; and SOEs making losses received government subsidies to allow them to fulfil their liability of providing medical care. SOEs also covered the medical care expenses of their retirees.

During the economic transition, this SOE-based medical care insurance program had similar problems as the SOE-based pension program (see Introduction of this chapter). However, the overhaul of the medical care system did not begin until 1998, almost twenty years after economic reform commenced, even though pilot projects were carried out in some cities[36]. The delay was partly due to the fact that medical care reform was more sensitive: it related to every person, regardless of age. It was also because medical care expenses were less significant at the time, compared with the pension program. Figure 4-1 shows three time series for state-owned work units: the

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[35] The former was discussed in Chapter 3, as part of the LIR. The operation of the latter was very similar to the former.

[36] The most famous pilot project of medical care reform is the so-called 'two-jiang reform', initiated by the Ministry of Labour and Ministry of Health in 1994, at Zhen-jiang city and Jiu-jiang city. This project had an important impact on the major reforms in 1998. See Wang and Liu (et al. eds. 1998)

ratio of social welfare expenditure[37] to total wage payments, the share of pensions, and the share of medical care expenses in social welfare expenditure. Obviously, the cost of social welfare programs of state-owned work units was rising during the 1980s and 1990s: from less than 20 percent of total wages in 1980 to more than 35 per cent in 1998. However, the share of the two major programs of social welfare system, pensions and medical care, moved in quite different ways: while the share of pensions rose from about 35 percent in 1980 to over 60 percent in 1998, medical care declined from more than 30 percent to about 24 percent.

In addition, medical care insurance has its own special feature: individual SOEs had more scope to adjust expenditure within medical care insurance programs. Unlike pensions that were specified by government regulations, there was no explicit regulation with regard to how much SOEs should pay for the medical expenditure of their employees. Some SOEs had their own medical clinics or even hospitals, which could be used to control some medical expenses. Cost-control of medical care expenses by SOEs included demand-side control and supply-side control.

1. Demand-side control. Individual SOEs as well as other work units started medical cost control reform in 1984 (He 2000). Initially, cost control focused on the demand side within SOEs. For example, some SOEs required individual employees to pay a certain percentage of medical expenses; some SOEs set a lump sum limit on medical expenses for individual employees, with unused funds given to employees. Employees had to pay for part of excess medical expenses (He 2000).

Since 1985, reforms of hospital services and relaxation of control of medicine prices required the cost-control reform to extend to the supply side of medical services. This also reflected another feature of the medical insurance program, the 'induced demand' problem.

2. The 'induced demand' of medical care refers to the situation where the supplier of medical care (including medicine) has an incentive to induce patients to consume too

[37] As discussed in Chapter 3, social welfare expenditure of SOEs includes pensions, medical care, childcare, and expenditure for other collective welfare facilities.

much medical services. Due to asymmetric information between patients and doctors, induced demand for medical care could push up the costs of medical services.

Chinese hospitals used to be government institutions, which provided medical services to people. Nurses and doctors were government employees and their income had nothing to do with the actual provision of medical services. The reform of hospitals introduced market mechanisms: (a) hospital employees' income were related to hospital revenue, (b) the share of government budgetary appropriation in hospital revenues was reduced, while that from medical services was raised. To compensate for the reduction of budgetary funds to hospitals, the government allowed hospitals: (1) to add 15 percent to medicine prices when they are sold in the hospital,[38] and (2) to charge examination fees for new equipment and instrument for medical services (Wang 1999b).

In the meantime, government control of medicine prices was relaxed, as with other prices. In the 1980s, while control of domestic medicine prices was maintained, there were no restrictions on the prices charged for medications supplied by joint ventures or foreign producers.

These reforms clearly encouraged hospitals to prescribe and sell more medicines, especially more expensive ones produced by joint ventures and foreign companies. It also encouraged the use of more expensive new equipment to conduct medical examinations and treatment (Bloom 1997; Wang 1999b). As a result, the revenue of Chinese hospitals from sales of medicines accounted for a large proportion of total revenue. For example, the share of all hospital revenues from medicine sale was 66 per cent in 1985, and 63 per cent in 1990[39].

Cost control reform was also extended to the supply side: hospitals and the pharmaceutical industry. Examples included the follows: a) some SOEs signed a contract with a designated hospital, which was the only hospital where their employees could receive free or partially reimbursed medical services. The hospital provided these

[38] Prior to the reform, Chinese hospitals provided both medical services and medications. Patients obtained prescriptions from doctors, and then bought the medicine from a pharmacy belonged to the hospital.

[39] The figures are for all medical care institutions in China. However, most hospitals are in cities. Calculated based on figures in Du and Lu (1996: 540-41).

services for a lump sum payment by the SOE determined in the contract; b) SOEs made a list of medications and medical services that could be subsidised. Employees and the doctor could only choose from the list to be reimbursed for medical expenses (Wang 1999b).

Despite cost-control measures implemented at SOEs, medical care expenditure of state-owned work units increased during the 1980s and 1990s (see Table 4-7). The real value of medical care expenses rose by a factor of four between 1980 and 1998. In the meantime, its proportion to total wages of SOEs increased from less than 6 percent in 1980, to nearly 10 per cent in 1998. In the meantime, total health expenditure[40] as a share of GDP was rising (Figure 4-2). It rose rapidly from about 3.2 per cent in 1980 to 4.6 percent in 1997.

The structure of the health expenditure was also experiencing changes (Figure 4-3). In China, health expenses are shared by the government, firms, and individuals. While total health expenses were rising between 1980 and 1997, most of the increase was borne by individuals. Government expenditure includes government budgetary appropriation for public health service, and for public medical care programs, such as medical research and medical education. Firms' expenditure includes health expenditure from SOEs, other urban and rural firms, as well as rural collectives. Individual expenditure refers to health expenses paid by rural and urban residents. In 1990, firms (including rural collectives) and individuals contributed a similar share in national health expenditure, 38 and 37 per cent, respectively, while the government share was about 25 per cent. The share of the government and firms (including rural collectives) had steadily declined since then. In 1997, the figures were 15 and 28 per cent, respectively. Accordingly, the share of individual spending increased by 20 percentage points to 57 per cent in 1997. The increased share of individual health expenditure comes mainly from the rising share of urban residents. The share of health spending by urban people in total health expenditure rose from 11 percent in 1990 to 23 percent in 1997, while that of rural residents rose from 26 to 34 per cent (Health Economics Research Institute 1999).

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[40] Health expenditure is a broader concept than medical care expenses: it includes expenditure on health products, such as health magazines and tonic medicines, which are not directly related to illness. The figures also include both rural and urban areas. They are used here to approximate the situation in cities.

The urban medical care insurance system was also in need of reform. The old system suffered similar problems as the old, PAYGO pension system. The SOE-based medical insurance was facing shrinking coverage and lack of risk sharing, as well as soaring costs for both SOEs and individuals. The two major reforms happened in the 1990s.

4.4.2 Reforms of Medical Care System in Urban China

The first major medical care reforms in cities involved some city level governments pooling medical funds in 1988. In 1998, the central government initiated a major reform to establish a new nationwide, basic medical care insurance system.

4.4.2.1 Social Pooling of Medical Funds for Severe Diseases

With soaring medical care costs, it was very difficult for individual SOEs to bear the risk of medical expenses, especially for severe diseases. As in the case of the initial reform of the old pension system, some local social security departments started to pool funds from SOEs to share the risk of medical costs for severe diseases. SOEs were required to contribute a fixed proportion[41] of their total payroll expenses to the local government-managed social pool. Employees of participating SOEs received financial assistance from the pooling fund when they had severe diseases[42].

This reform introduced an element of risk sharing into the SOE-based medical insurance program. However, it did not deal with the more fundamental problems of the old program, and the social pooling did not restore its financial viability (Qi 1996). A city level social pool could also generate barriers for labour mobility.

4.4.2.2 Establishing a New Basic Medical Care Insurance System in Cities.

After several pilot projects, a national medical care reform was initiated by the central government in 1998. Major reform measures are listed in the document 'Decisions about Establishing a Basic Medical Care Insurance for Urban Employees' (Kang and

[41] How the proportion was determined in cities is not clear. Qi (1996) states that the rate for some cities, including Beijing and Tianjin, was 3% of total wages.

Feng 2000)[43]. This reform is aimed at establishing a basic medical care insurance program covering all employees in cities. The medical insurance is compulsory. The new program is financed by employer and employee contributions: the employer contribution is (around) 6 percent of total wages, and the employee contribution is 2 per cent of wages.

The new program is composed of a social pool and individual accounts, managed by each local government department of social security, at the prefectural level.[44] Contributions from employers and employees are divided into two parts: 70 per cent of employer contribution, or 4.2 per cent of total wages, is put into the social pool. All employee contributions, plus 30 per cent of employer contributions, that is 3.8 per cent of individual wages, is put into an individual account. The proportion of contributions into the social pool and the individual accounts, 4.2: 3.8, is roughly the same as the proportion of hospital expenses versus outpatient expenses of total public medical care expenditure in 1997 (He 2000).

The social pool is a risk sharing mechanism, mainly paying for severe diseases, while the individual account is used to finance minor illnesses. The coverage of the social pooling fund and individual accounts is not specified by the government. In practice, local governments usually divide the coverage according to: (1) medical expenses; (2) outpatient or inpatient; and (3) types of illness (Li and Li 2000). Local governments also determine the threshold and the maximum amount of payment from the social pooling fund. In principle, the threshold should be around 10 per cent of annual average wages of the social pooling area, while the maximum amount should be about 4 times annual average wages. Medical expenses below the threshold are paid by the patients, including funds in their individual accounts. Medical costs above the threshold and below the maximum amount are shared by the individual and the pooling fund, but is mainly paid from the pooling fund. How the costs are shared varied, often according to the age of the patient and the hospital where the patient is treated. Medical costs that are

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[42] Reforms varied from city to city. See Qi (1996).
[43] The discussion that follows is based on the 1998 government document in Kang and Feng (2000) (eds.).
[44] In the Chinese administrative hierarchy, prefectural level is below province level, but above county level.

higher than the prescribed maximum amount paid by the pooling fund are borne by the patient (Li and Li 2000).

The individual accounts are owned by individual employees. Each account is under the employee's name, but is administered by the local social security department of the government. Funds in individual accounts can only be used for medical care expenditure. Unused funds in individual accounts are accumulated in the account, as well as the return on the funds. There are three types of returns: (1) unused funds from current year contribution have the same return as bank deposits; (2) unused funds carried over from the previous year have the same return as the bank interest rate for three-month term deposits; (3) unused funds from a year ago have a return at the similar rate as the three-year term deposits in banks. Both funds and returns can be carried over for medical expenses, inherited by relatives, and transferred when employees change jobs (Li and Li 2000).

Current retirees must join the program and establish their individual accounts. However, they do not make contributions to the individual account. Instead, their ex-employers contribute (separately) into the accounts. Compared with current workers, retired patients bear lower proportions of medical costs that are between the threshold and the maximum amount that can be paid by the social pool.

The reform also included the provision of medical services and medicines. The main idea was to appoint some medical care institutions, such as hospitals, clinics, and pharmacies as designated institutions for the medical insurance program. These designated institutions and pharmacies must have appropriate qualifications, and sign a contract with the local social security department with regard to the scope of services, quality control, cost control, etc. Participants of the program may only seek medical services from these designated medical institutions, and fill prescriptions from designated pharmacies. The reform also requires that sales of medication and provision of medical services should be separated, and competition should be encouraged among medical institutions and pharmacies in order to reduce costs.

4.4.3 Some Comments about the Urban Basic Medical Care Insurance

Since the reform in 1998, coverage of the basic medical care insurance program has increased but slowly; so too have contributions and reserves. By the end of 2000, the program covered 43.3 million urban employees and retirees, which was about 17 per cent of all urban employees and retirees. Total contributions in 2000 were 17 billion yuan; total outlay was 12.4 billion yuan. By the year-end, accumulated contributions were 8.9 billion yuan. By the end of 2001, 27 percent of all urban employees and retirees (76.3 million) were covered by the program. Total contributions in 2001 were 3.8 billion yuan, while total outlay was 2.4 billion yuan, with an accumulated reserve of 25.3 billion yuan at year-end[45].

While the reform takes time to implement, there are a few issues that raise concern. Firstly, during the first two years after the reform, total contributions were much more than total outlays: outlay were about 73 per cent of contributions in 2000, and only 63 per cent in 2001. It is not clear how much of the reserve was in individual accounts and how much was in the social pool. If the reserve was mainly in the social pool, it might suggest that the contribution rate was too high; if it was mainly in individual accounts, then the regulation and management of these funds became important. This is because unless individual accounts are privately owned and earn market returns, the system acts like a tax and inhibits risk sharing over time for individuals[46].

Secondly, the reform in 1998 reduced the financial burden of the government in medical care provisions. In the new scheme, government does not have direct financial liabilities for medical care. Its functions include: collecting and managing medical insurance contributions; regulating and supervising designated medical institutions and pharmacies; updating medications and medical services that are covered by basic medical insurance. However, the administrative costs of the scheme are paid out of government budget. Accumulated contributions are managed by government departments, and must be put into a special account in state-owned banks. How to minimize administration costs, and how to use the accumulated funds efficiently will affect the actual public liabilities in medical care insurance.

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[45] Calculated based on figures in MOLSS (2000), MOLSS (2001).

Thirdly, the impact on labour mobility should not be overlooked. The social pooling of the medical care insurance fund is at the prefectural level. Potentially, this raises two concerns for the program. The first is whether the pool of risk sharing is large enough to cope with medical care expenses. The second is whether the pooling will generate potential barriers to labour mobility across prefectures, since contribution rates and the scope of payment from individual accounts, etc, are different across regions.

Finally, the coverage of medical care leaves unemployed people out of protection. The coverage of the new basic medical care insurance only includes employees and retirees, and leaves out unemployed people, and others who are not in the labour force, such as children. Currently, medical insurance for family members of employees, especially children, still follows stipulations in the pre-reform program, which allows a certain percentage of reimbursement of medical expenses from the employer (Li and Li 2000). This arrangement is obviously not consistent with the trend of social security reform, since it leaves the provision of basic medical care of dependants of employees to individual employers. Whether the program should provide basic medical care for these people and how to do so needs to be dealt with as soon as possible.

4.5 Other Social Security Reforms

In addition to unemployment, pension and medical care insurance, other major social security schemes in the pre-1978 system have also been reformed. These are maternity insurance and occupational injury insurance.

4.5.1 Maternity Insurance

In the pre-reform labour insurance system, female employees in publicly-owned work units received paid maternity leave, as well as reimbursement of medical expenses associated with pregnancy and birth. The work unit paid all benefits out of its current operating surplus, as part of their social welfare liabilities.

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[46] The principles that ensure the minimum disincentive impact of mandatory savings with individual accounts are discussed in more details in Chapter 7 in the context of pension reform.

In a market economy, the firm-based maternity benefit program imposes a tax on firms, and the actual tax rate varies with the age and sex structure of employees of the firm. The potential costs associated with maternity benefits may affect the decisions of firms to employ females of childbearing age.

The maternity insurance reform in China started in 1995, with regulations in the document 'The Stipulation for Trial Implementation of Firm Employee's Maternity Insurance' (the Stipulation) (Kang and Feng 2000).

According to the Stipulation, insurance funds for maternity benefits are managed by government social security institutions at city or county level. Funds are contributed by employers, at a rate determined by the local government. The contribution rate is based on the expected number of births and associated benefits, but must not exceed 1 per cent of total wages. The scheme is designed to cover all female employees in all urban firms.

Maternity benefits paid by the insurance fund include[47]: (1) maternity allowance during maternity leave. The allowance is equal to the average wages of the firm during the previous year; (2) medical care expenses during pregnancy and birth, such as examination, operation, hospital and medication; (3) medical expenses for illness caused by the birth. Administrative costs of the program are also paid from the fund, but they must be no more than 2% of the fund. The balance of insurance fund is deposited in the bank and receives bank deposit interest rate.

Table 4-8 demonstrates the progress of the maternity insurance program during the first few years after the reform. Insurance coverage doubled between 1995 and 1999, although it was still only 14 per cent of total urban employees in 1999. Each year, fund revenues exceeded outlays, so that the balance accumulated rapidly, and was more than the total fund revenues.

If the excess reserve of the fund is due to the high contribution rate, the program has imposed an unnecessarily high tax burden on firms. Due to the family planning policy in China, females who plan to have babies need to register at the government family

[47] Details of the benefits are not clear. They are determined by local (municipal) government and may vary between cities.

planning organization in order to obtain a 'birth-permission certificate', before they pregnant. This policy reduces uncertainty as to number of births during a year, and thus the expected payout from the insurance fund. As a result, the local social security department could have a more accurate estimation of the contribution rate for the year.

An accurate contribution rate is also important since according to the Stipulation, unused funds have to be deposited in a state-owned bank, and receive returns as a bank deposit. Since the balance of the fund does not have a market return, which is usually higher than the government regulated bank interest rate, it causes further inefficiency when the program has a large amount of reserves.

4.5.2 Occupational Injury Insurance

Occupational injury insurance was also part of the pre-reform social security system that was operated by individual work units, and financed out of their current operating surpluses. As in the case of other labour insurance programs, this program has been facing reform pressure.

The reform commenced when the document 'The Stipulation for Trial Implementation of Occupational Injury Insurance for Firm Employees' was issued in 1996. The main regulations are discussed briefly here.

The program aims at covering employees in all firms and is administered at the city level by the local social security department. It currently provides for 11 types of benefits[48] for occupational injury[49] (details are in Table 4-9). However, only 8 [50] are paid from the social pooling fund, while firms pay for the remaining 3 types.

The social pooling funds are contributed by employers, at rates determined by the local government. The contribution rate varies according to risks associated with the industry.

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[48] These 11 types are: (1) Medical expenses due to the occupational injury, including transportation cost, hospitalisation, etc; (2) nursing costs due to the injury; (3) pension for the injury; (4) lump sum subsidy; (5) costs of supplementary equipment for injured employees; (6) funeral allowance, (7) dependant allowance; (8)lump sum occupational death subsidy; (9) occupational injury allowance; (10) settlement subsidy; and (11) reemployment subsidy.

[49] There are detailed lists and regulations of the types of occupational injury as well as classification of injuries.

Within each industry, the contribution rate of individual firms could fluctuate within 5-40 per cent of the industry rate, depending upon both the firm's occupational safety status, and actual payments for occupational injury during the previous year. The industry rate is adjusted every five years, while the firm rate is adjusted annually.

The 1996 reform significantly increased risk sharing among firms for occupational injuries. It also provides unified compensation rules for all employees of all types of firms. The difference in contribution rates between industries and firms within the same industry provides an incentive for firms to take precautions to prevent occupational injuries.

Table 4-10 lists some figures for the occupational injury insurance program. As in the case of the maternity insurance program, fund revenue exceeded outlay in each year between 1996 and 1999, and the fund balance was more than double its revenue in the latter year. This implies an excess tax burden on firms. In addition, since the fund can only be deposited in state-owned banks, the returns on the balance are likely to be lower than the market return.

Despite its aim of covering all employees in cities, the coverage of the program was very low at the end of 1999. Note that this coverage is of urban employees only, and at the national level, the coverage is even lower. The low converge is perhaps the result of a too high contribution rate reflected in excess reserves.

4.6 Conclusions

The economic transition in China had changed the institutional foundation as well as the basic economic mechanism that the old social security system was built upon. This had generated pressure to reform the old Chinese social security system. This chapter reviews major reforms of the social security system in urban China during the 1980s and 1990s, especially the programs that were related to the LIR. These reforms were part of the process of transferring the previous, work unit-based labour insurance system into a new, employment-based social security system. An unemployment insurance program has been established in line with labour market reforms and

[50] They are the first 8 types in footnote 48.

emerging open unemployment. Programs for contingencies that were covered by the LIR, such as old age, basic medical care, maternity and occupational injury, have also been overhauled. This review focuses on the unemployment, pension and medical care programs, which affect the majority of urban employees. Reform policies are in the process of being implemented, but they have shaped the main features of the current and future social security system in urban China. These features are summarized as follows.

First, reforms have focused on cities, with insurance programs mainly for urban employees[51]. Rural arable land in China belongs to the collectives[52], and all rural residents are entitled to have access to a piece of land. Access to land is regarded as the social security provided to rural Chinese people (Ming 1999; Zhao and Wen 1999). The urban focus and the employment focus of social security system are features inherited from the old system during the command economy.

Second, the new system aims at expanding its coverage from employees in the public sector only to employees in the private sector as well. This leaves people who are self-employed and those long-term unemployed out of some basic social insurance. As discussed, this is especially significant in the case of the basic medical insurance.

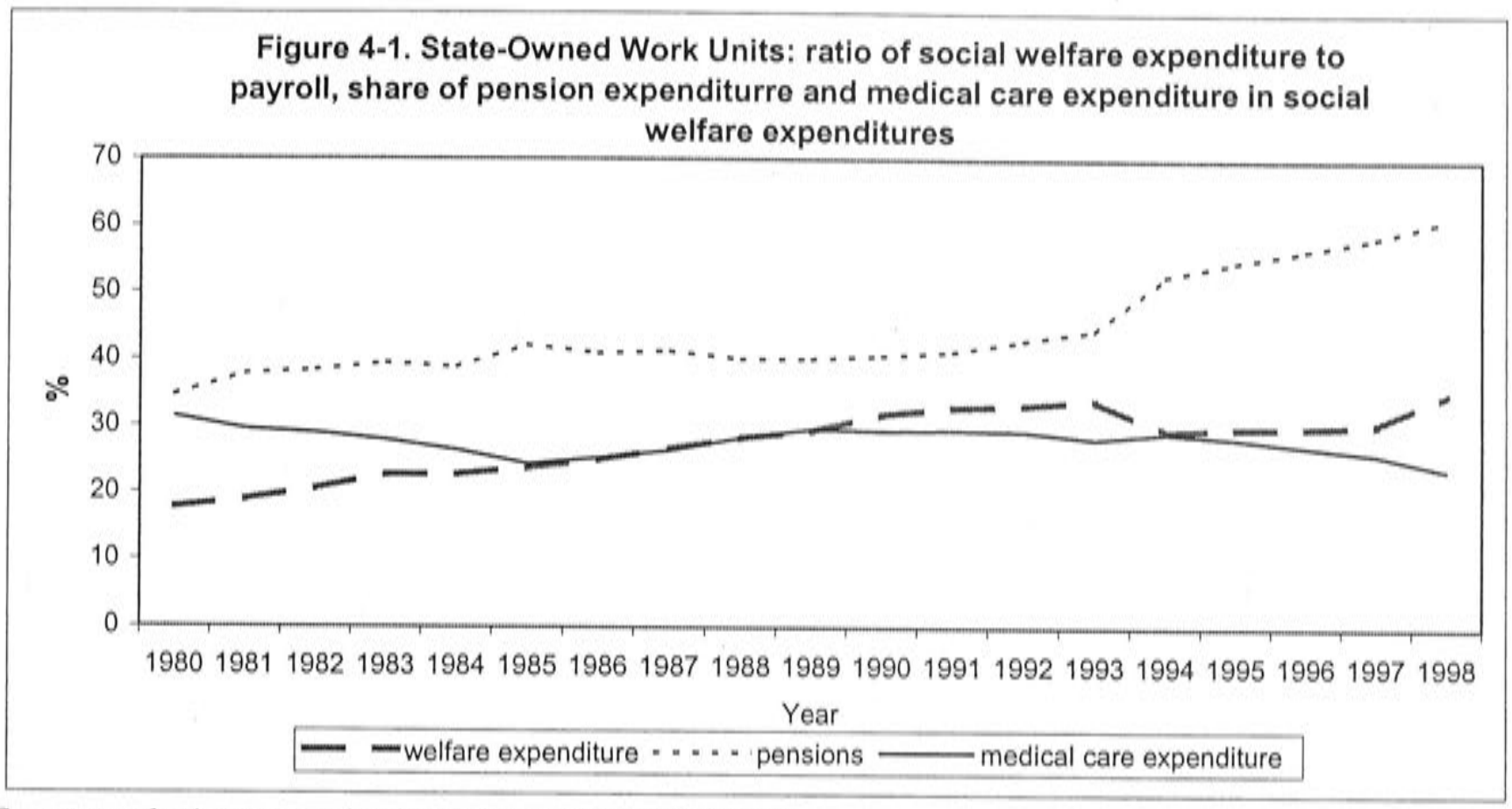
Third, all of the new programs are operated at the local levels. According to the reform policies, the pension scheme is designed to be administrated by the provincial government. The unemployment insurance scheme is operated at the municipal level, with an adjustment fund at the province level, while the basic medical care insurance and the occupational insurance program are operated at the city level. In practice, some of the social pools of contributions are still at a lower level than the government targeted one. Potentially, social insurance programs at a low level may not be able to provide sufficient risk sharing. It may also create barriers to labour mobility.

Fourth, the finance of the social security programs has been changed significantly, yet the government still plays an important role in terms of financial support of these programs. Compared with the situation during the command economy, when the

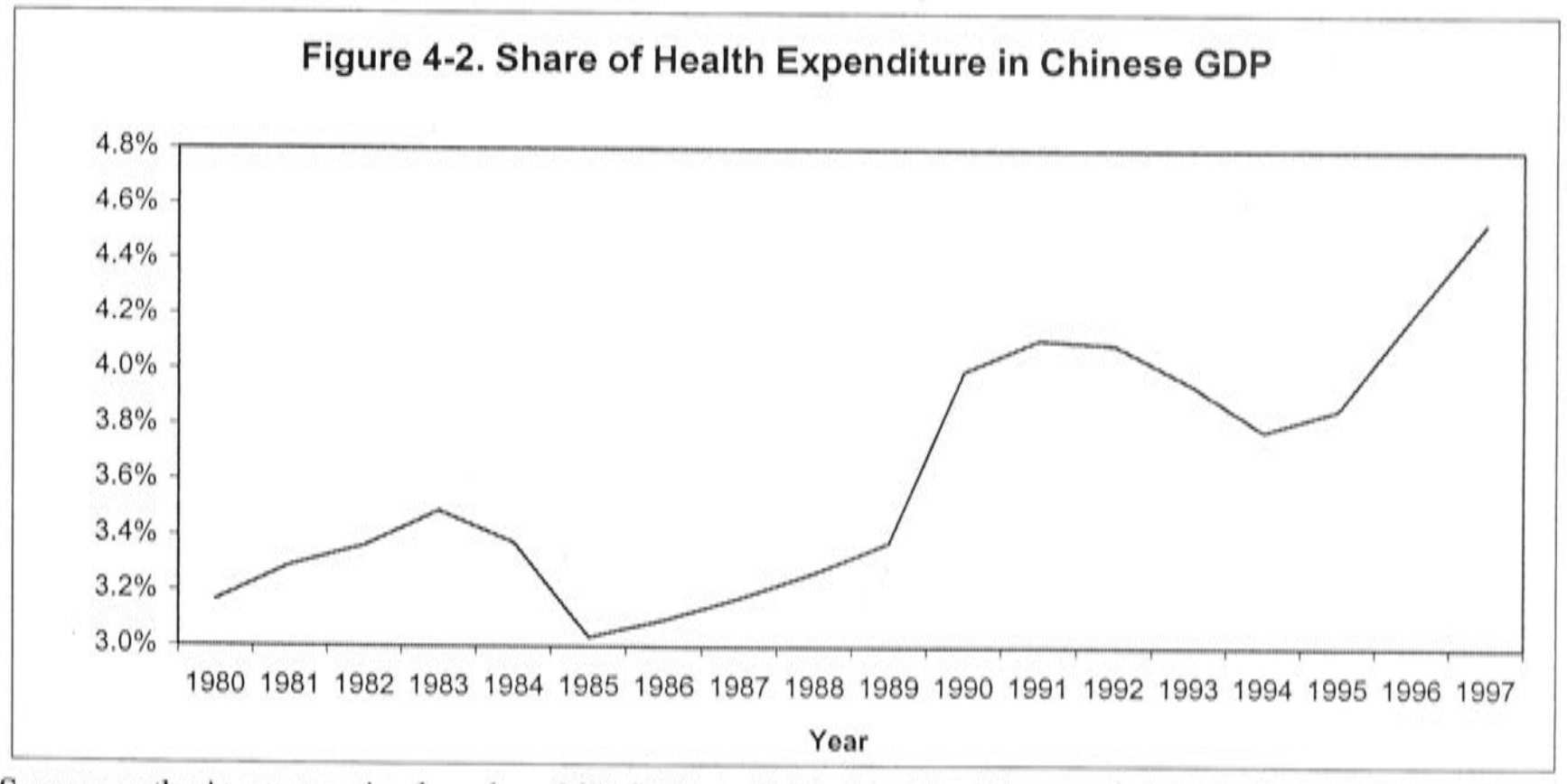
[51] Except the occupational injury insurance, which includes all employees in all firms in China.
[52] Forests, mining areas and urban land belongs to the state.

government essentially financed the programs on an implicit PAYGO basis at the national level, explicit mandatory contributions from both employers and employees are now specified by government regulations. In addition, the new social security programs have adopted a multiple-funding strategy. For example, in the new pension scheme, there is a scaled-down PAYGO component financed by employer contributions. There is also a funded component that uses individual accounts to accumulate mandatory savings for employees. The basic medical care program has similar arrangements. Lots of efforts have been contributed to ensure the financial sustainability of the new programs. However, the government still explicitly or implicitly promise to bail the locally operated funds if necessary.

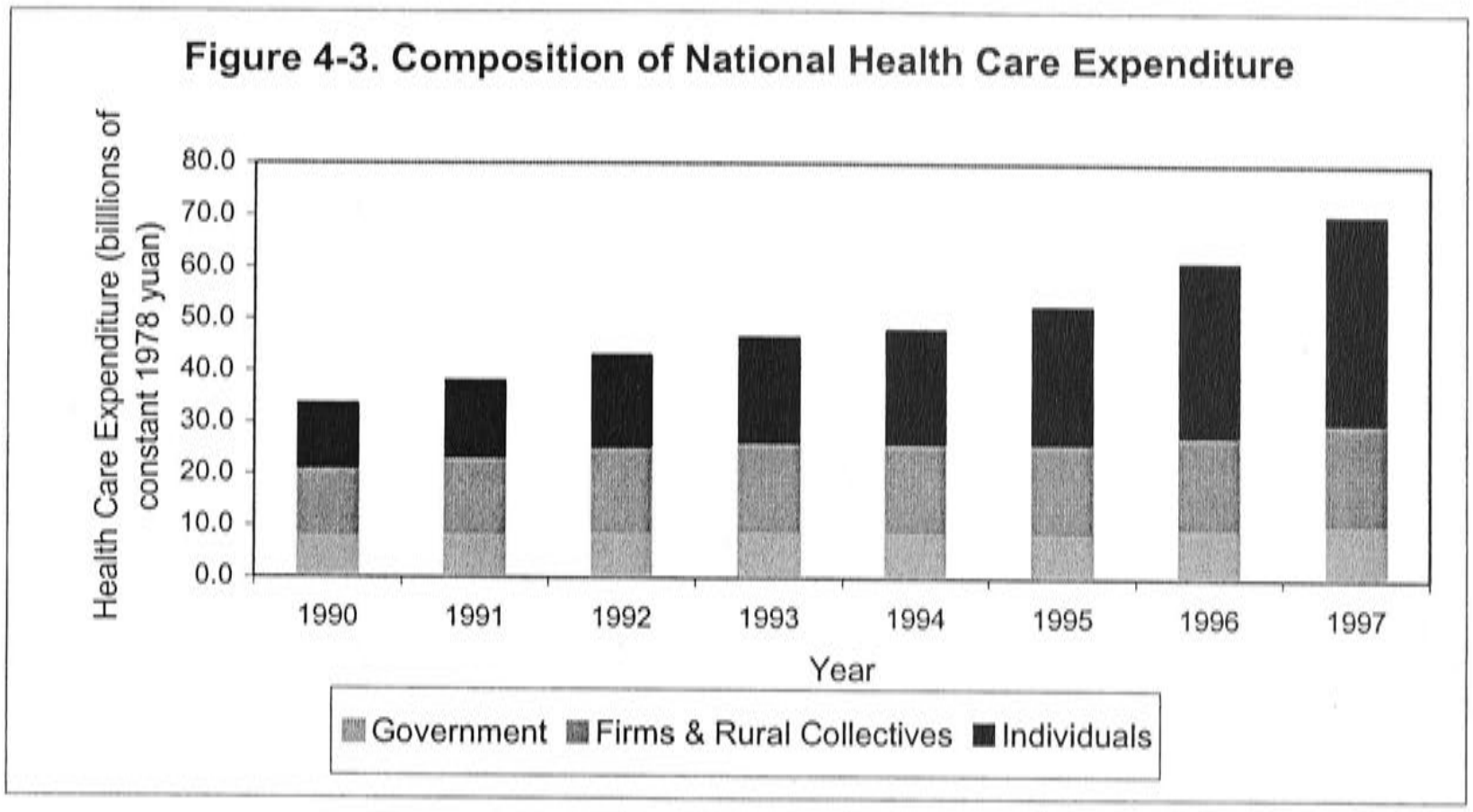
In this brief review, it is noticed that some of the programs have accumulated lots of funds over the years, such as the maternity insurance and the occupational injury insurance program. It is a concern that excessive contributions impose taxes on the private economy and leads to inefficiency. This is especially so when the accumulated funds cannot be invested to have the market return. Similar issues are raised for the pension scheme and the medical care insurance, where individual accounts are used to accumulate mandatory savings. These issues are also important for the financial sustainability of these programs, since the taxation component of social security contributions often leads to incompliance among firms (Zhao and Xu 2002). Since these impacts depend very much upon the detailed designs of the program, the discussions in this chapter only provides a background for the analysis in the later chapters of this study. Chapters 6 and 7 will focus on taxation impacts of the social insurance system, in the context of the old age pension program.



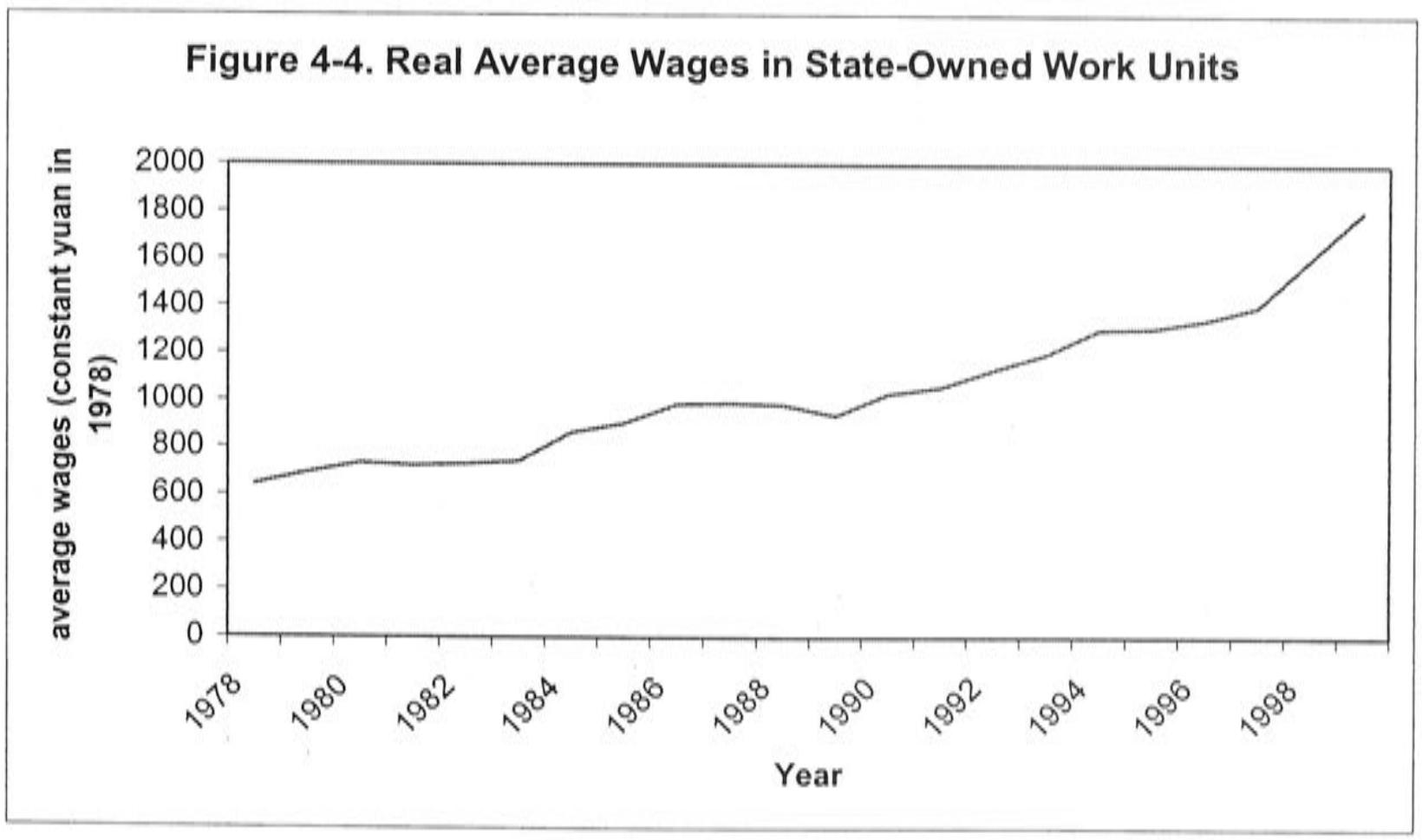
Source: author's construction based on SSB (various years).



Source: author's construction based on SSB (2001a); Table 1 in Liu, Zhao et al. (2001); figures for total health expenditure are from Health Economics Research Institute (1999), and Zhao (1999).



Source: Same as for Figure 4-2.



Source: Author's construction based on SSB (2001a).

Table 4-1. Summary of Chinese Unemployment Insurance Reforms in the 1980s and 1990s

Time	1986	1993	1999
Document	Temporary Insurance Regulation for SOE Employees Waiting for Jobs	Stipulation of Insurance for SOE Employees Waiting for Jobs	Rules of Unemployment Insurance
Coverage	Four categories of ex-employees of SOEs	Seven categories of ex-employees of SOEs	All urban employees, except public servants
Finance	Employer contribution; Budgetary appropriation	Employer contribution; Budgetary appropriation	Employer contribution; Employee contribution: Budgetary appropriation
Unemployment benefit	Unemployment relief: between 50% to 75% of standard wages	Relief: 20-50% above social relief[a], plus Medical care subsidy; Funeral subsidy and dependant allowance; Other benefits	Unemployment relief between social relief and minimum wages; Medical care subsidy; Funeral subsidy and dependant allowance Other benefits
Duration	12-24 months	12-24 months	12-24 months

Note: a. social relief refers to the local poverty line, the minimum living security line (details in Chapter 5).

Table 4-2. Employment Structure by Ownership in Urban China[a] (1980-1999)

Year	State-owned (%)	Collective-owned (%)	Other Ownership (%)	Total
1980	76	23	0	99
1985	70	26	0	96
1990	62	21	1	85
1995	57	16	5	78
1996	55	15	5	75
1997	53	14	5	73
1998	43	9	8	60
1999	40	8	8	56

Note: a. Figures are based on total urban employment, including all people who worked and received income during the year.

Source: Figures are from page 8 and 14, SSB (2001a).

Table 4-3. Unemployment Insurance Program: Coverage, Fund Revenue and Fund Outlay during the 1990s

Year	Number of Employees covered (millions of persons)	% of total urban employees[a] (%)	Revenue (billions of current yuan)	Total Outlay (billions of current yuan)	Funds to reemployment centres (millions of current yuan)	Balance at the yearend (billions of current yuan)
1996	83.3	56	4.5	2.7	-	8.6
1997	79.6	54	4.7	3.6	-	9.7
1998	79.3	64	6.8	5.2	1.5 (22%)[b]	11.3
1999	98.5	81	12.5	9.2	4.1 (33%)	14.6
2000	104.1	90	16.0	12.3	4.9 (31%)	18.3

Note: a. urban employee excludes private firms and self-employed people (There were few years the number of urban employees declined).

b. The figure in bracket is the share appropriation from to reemployment centres in the overall fund revenue.

Source: author's construction based on SSB (various years), and MOLSS (various years) on line http://www.molss.gov.cn.

Table 4-4. A Summary of Public Pension Reforms in China in the 1980s and 1990s

Major reform	Coverage	Major reforms
1. Social pooling of pension funds (1984)	SOEs	Within a pooling area (initially counties and cities; later provinces), SOEs contributed to a social pooling fund according to a unified rate. Pensions were then paid from the social pool.
2. Fully funded pension scheme for contract workers in SOEs (1986)	Contract workers of SOEs	Employer: 15% total wages of contract workers Employee: about 3% wages. Contributed into separate funds from the social pool of permanent employees
3. Employee contributions introduced for all employees of SOEs (1991)	Employees of SOEs and state-owned work units	Employee contribution about 3% wages. Accumulated funds of contract workers were combined with social pooling funds of permanent employees of SOEs.
4. Reforming pension benefits (1993)	SOEs in pilot cities	Pensions = social pensions+ contribution pensions Social pension =15-25% of local average wages in the pervious year; Contribution pensions: depend on contribution years
5. Individual account, a three-pillar pension program (1995)	All urban employees	A three-pillar pension system that comprised: 1) elementary pensions (PAYGO, social pooling fund at the city it county level); 2) individual account pinions (privately owned individual accounts, fully funded); and 3) other supplementary pensions (half-voluntary, at enterprise lelvel. Still undergoing experiments).
6. Unification of pension programs within provinces (1997)	All urban employees	All pension programs within each provinces were required to be unified into one scheme, in terms of contribution rate, pension benefits, management of social pooling funds and individual accounts, etc.

Table 4-5. Retiree/employee Ratios by Ownership Structure in China

Year	Total Employees (million persons)	Total retirees (million persons)	Retiree/employee ratio (%)	Retiree/employee ratio (state-owned units) (%)	Retiree/employee ratio (collective units) (%)	Retiree/employee ratio (other units) (%)
1982	112.8	11.1	0.10	0.10	0.09	-
1985	123.6	16.4	0.13	0.13	0.14	0.13
1987	132.1	19.7	0.15	0.15	0.15	0.11
1989	137.4	22	0.16	0.16	0.16	0.08
1990	140.6	23	0.16	0.17	0.16	0.06
1992	147.9	26	0.18	0.18	0.17	0.07
1995	149.1	30.9	0.21	0.22	0.21	0.08
1996	148.5	32.1	0.22	0.23	0.21	0.09
1997	146.7	33.5	0.23	0.25	0.22	0.08
1998	123.4	36	0.29	0.32	0.32	0.12

Source: author's calculation based on SSB (2001a).

Table 4-6. Average Pensions, Average Wages and their ratios, Selected Years (current yuan)

Year	Average wages (yuan/year)	Average pensions (yuan/year)	Average pensions/average wages (%)
1982	798	709	89
1985	1148	935	81
1989	1935	1478	76
1990	2140	1760	82
1992	2711	2300	85
1995	5500	4335	79
1996	6210	4923	79
1997	6470	5458	84
1998	7479	5972	80
1999	8346	6614	79

Note: average wages does not include wages of private firms, income of self-employed, etc.
Source: author's calculation based on SSB (2000a).

Table 4-7. Medical Care Expenditure in State-Owned Work Units

Year	Medical care expenditure (Billions of current yuan) (1)	Medical care expenditure (Billions of 1978 yuan)	Total wage bill (Billions of current yuan) (2)	(1)/(2) (%)
1980	3.6	3.3	62.8	5.7
1983	5.0	4.3	74.8	6.7
1985	6.5	4.8	106.5	6.1
1988	15.1	8.0	180.7	8.4
1990	22.6	10.2	232.4	9.7
1992	31.8	12.5	309.0	10.3
1994	47.3	12.8	517.7	9.1
1996	61.6	13.2	679.3	9.1
1998	65.8	13.8	681.3	9.7

Source: author's construction based on SSB (various years).

Table 4-8. Maternity Insurance in Urban China

Year	Number of employees covered (millions of person)	% Of total urban employees	Revenue (billions of current yuan)	Outlay (billions of current yuan)	Balance at the yearend (billions of current yuan)
1995	15.0	7.9	0.3	0.2	0.3[a]
1996	20.2	10.2	0.6	0.3	0.6
1997	24.9	12.3	0.7	0.5	0.8
1998	27.8	13.4	1.0	0.7	1.1
1999	29.5	14.0	1.1	0.7	1.5

Note: some cities started the reform before 1995. As a result, the balance at the end of 1995 includes balance from previous years.
Source: author's calculation based on SSB (2001a).

Table 4-9 Benefits for Occupational Injury of the Occupational Injury Insurance Program Reform in 1996

Entitlement	Benefits	Source of Fund
Medical treatment	All relevant **medical expenses**, including transportation, 2/3 of boarding costs; hospital, medication, etc.	Insurance fund
Medical care period	1-36 months, with **occupational injury allowance** equal to the average wages of the employee during the 12 months prior to the injury	Employer
Nursing fee	30-50% of the average wages of local employees (AW) during the previous year	Insurance fund
Supplementary equipment	Costs of artificial limb, eye, tooth, etc. can be reimbursed	Insurance fund
Occupational injury pension for those who are severely injured (levels 1-4) and have to resign from the job	Pensions: 75-90% of employee's wages; **Lump sum subsidy**: 6-24 month wages; **Settlement subsidy** for those who choose to move to another city (county): 6 month AW in the area+ expenses during the trip	Pensions, lump sum subsidies are from the Insurance fund; Settlement subsidies are from the employer.
Occupational injury allowance	Paid according to average wages of the employee prior to the injury	Employer
Occupational death treatment	**Funeral allowance**: 6 month AW of the region during the previous year. **Dependant allowance**: spouse--40% the ASP; other dependant--30% of the AW per person. Total allowance no more than 100% of the employee's wages; **Lump sum occupational death subsidy**: 48-60 month of the AW	Insurance fund

Note: The table does not include all the details of the document.
Source: Author's construction based on Kang (2000).

Table 4-10. Occupational Injury Insurance in China

year	Total employees covered (millions of persons)	% of urban employee	Revenue (billions of current yuan	Outlay (billions of current yuan)	Balance at the yearend (billions of current yuan)
1996	31.0	15.6	1.1	0.4	2.0
1997	35.1	17.4	1.4	0.6	2.8
1998	37.8	18.3	2.1	0.9	4.1
1999	39.6	18.8	2.1	1.2	5.0

Note: some cities started the reform before 1996. As a result, the balance at the yearend of 1995 includes balance from previous years

Source: author's calculation based on SSB (various years).

Chapter 5. The Urban Minimum Living Security in China—the Reform of the Urban Social Relief Program

5.1 Introduction

The initial reform of the urban social security system in China focused on the programs in the LIR that were employment-based. It was not until 1997 when the government initiated a major reform of the social relief program—the Urban Minimum Living Security (UMLS) program. The UMLS program intends to provide the ultimate safety net for all urban poor, employed or not. This was the state's response to the increasingly important phenomenon in Chinese cities—the urban poverty. However, this new program excludes poor people who are not legal urban residents according to the household registration system[1]. With more and more rural migrants work and live in Chinese cities, this limited coverage of the UMLS program has potential adverse impact on economic efficiency. This chapter reviews the background, the establishment, and the achievements of the UMLS program. It also contains discussions about the potential problems of this program.

The relatively late reform of the social relief program that targets all urban people is best understood in the context of the pre-reform social security system in urban China. As reviewed in Chapter 3, it was based on the provision by the government of lifetime job security for its employees and their families, which in practice included most urban residents. Associated with employment, urban people—those with urban household registrations were protected by a wide-range of those formally classified as social security programs. These included pensions, free medical care, occupational injury, and maternity benefits, as well as other fringe benefits and welfare benefits, such as nearly free accommodation and childcare. This system not only protected employees, but also family members, although it was less generous for the latter. The protection extended to the death of an employee, with funeral subsidies; and allowances for dependants. Those protected by this employment-based social security system had little need for the social

[1] The household registration system was established in the late 1950s and is still in place. It registers Chinese people as 'agricultural' and 'non-agricultural (urban) residents. For more details, see Chapter 3.

relief program, which was mainly used to protect urban people with no work unit[2], no family, and no source of support from any relatives. These were the so-called 'people without the three essentials' (*sanwu*)(Zheng, Wang et al. 2000).

During the pre-reform era, the household registration system (HRS), along with other policies[3], effectively curbed rural-urban migration and those among cities and among villages (Zhao 2003). As a result, people who lived in cities were mostly urban residents with urban HRS. Majority of these urban residents were employees of SOEs, they and their families were looked after by the work units and enjoyed a generous social security benefits. People in need among the other group of urban residents were by and large supported by the social relief program, often through the community-based residents' committee (see Chapter 3).

This situation was changed after the economic reform with the introduction of market mechanism of resource allocation (see Chapter 4). In particular, when job guarantees and job security no longer existed, the employment-based social security could not protect the unemployed[4], nor people out of the labour force due to illness or disability. However, as long as they had previously been employed and thus belonged to a work unit, then according to the pre-reform arrangements, the work unit was supposed to support them, and thus they were not qualified as 'people without three essentials', and so were not entitled to any protection from the social relief program. With the deepening of the SOE reform, these people were often left without adequate support from any public resources.

During the 1990s but before the introduction of the UMLS program, urban people in need could be broadly classified into three groups: (1) residents who had local urban household registrations[5] and were employed in the public sector; (2) Other urban residents who had local household registrations; (3) Migrants in cities who did not have local household registrations. This last category included those came from small cities

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[2] During the pre-reform period, once an individual was allocated to a work unit, the employment relationship was permanent. The work unit was also supposed to take care of the individual and his/her family for lifetime. See discussions in Chapter 3.

[3] The HRS and other policies that curbed migration within China during the pre-reform period are discussed in Chapter 3.

[4] Including retrenched workers during the economic transition. See details in Chapter 4.

to big cities but did not have the local HRS of the destination cities. However, majority of the migrants were from villages and they lived and worked in cities but did not have urban household registrations (Jiao 2002).

In terms of social security entitlement during that period, the first group had the most generous benefits and were often entitled to be looked after by their work units (as discussed in Chapters 3 and 4), although in practice they did not always received their entitled benefits[6]; the second group had minor benefits (the small amount of social relief for 'people without the three essentials' from the MCA's social relief program), while the third group had almost no social safety net. However, in terms of the need for social support, the order is just opposite: the most needy were often the third group and the least needy were the first group.

This brought about a strange situation in poverty alleviation in urban China during the economic transition, especially during the early to mid-1990s. On the one hand, the long-term unemployed, or people on low incomes, had formed a new group. These people, including both those with local HRS and the migrants who did not have the local household registrations, and their families had little or no reliable income, and were often too poor to make ends meet (Chen 1994). On the other hand, the old social relief programs, which were established to support needy people, did not cover this needy group, usually either because they had worked before and therefore were expected to be supported by their ex-employers (but their ex-employers could not or did not provide adequate support), or still belonged to a work unit, or simply because they did not have local household registrations. This gap between the need for poverty relief and the rigid, out-of-date provisions of support challenged the old social relief program. This situation also reflected the feature of a transition economy: while the old SOE-based social relief system was under reform and employer's social security function was reduced, a new system was not in place to meet the need of poor people. The lack of the new system also hindered the further reform of SOEs.

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[5] This refers to the household registration at the city level, since moving within a city is not restricted by the HRS.

[6] This was often due to the financial difficulties of their work units and the reduction of government subsidies towards SOEs in deficit during the SOE reform.

The role of government in poverty alleviation has a long history in the world (Novak 1988; United Nations 1996). Studies of various experiences show there are many different approaches to provide relief for the poor. Whether and how a government deals with poverty has economic consequences, such as impacts on income distribution, labour supply, human capital accumulation etc. Studies also indicate that poverty reduction policies should examine the causes of poverty, and the potential responses of the poor towards relevant poverty relief policies, as well as the overall efficiency impact on the economy (Hemming 1984; United Nations 1996).

As one of the significant parts of its social security reform, the Chinese government has chosen to establish the UMLS program. The program requires the city government to provide a guaranteed money income for any local residents who have the local household registrations, once their household income falls below the UMLS line. The UMLS line can thus be regarded as a kind of poverty line in urban China. This reform was initiated nation wide in 1997 and had been claimed to have covered all urban residents in China by the end of the 1990s[7]. With the progress of economic reform and the emergence of the new urban poor, the UMLS program has become an important part of the current Chinese social security system. While this new program targets all urban poor, it has ignored the need of migrants, in particular, rural migrants in cities. The possible implications of this problem, as well as other problems of this program are discussed later in this chapter.

This chapter is divided into six parts. The next part briefly discusses the experience of poverty alleviation in other countries. Part three looks at the background of the UMLS program. Part four reviews the establishment of the UMLS program. Part five provides a preliminary discussion with regard to the assessments and possible impacts of the current program. Some conclusions are drawn at the end of the chapter.

5.2 Some Experiences of Poverty Alleviation in the World

Many countries have public poverty reduction programs. Since China is a developing country that has just introduced market mechanism, this section focuses on the experiences in other developing countries, especially those in Asia, and on the experiences of developed countries during the early development of capitalism.

5.2.1 Poverty Reduction Experiences in Some Asian Countries

Most countries in Asia are developing economies, with large numbers of people living in poverty[8]. Poverty reduction has been part of these countries' policies. These policies include both macroeconomic policies and development strategies aimed at raising the incomes of the poor, as well as social security programs that directly improve their living conditions (United Nations 1996). Given that each economy has different economic and social features, these poverty reduction policies vary across nations. Given changing economic and social environments within countries overtime, country-specific poverty reduction programs evolve over time.

It is impossible to review all of the relevant poverty alleviation policies in all developing countries in this short section. However, it is useful to be aware of measures that have been taken in some other countries, especially those aimed at directly reducing poverty. Based on a United Nations' study (1996) of eight countries[9] in the Asia-Pacific region, their major poverty reduction measures, especially those that were current at the time of the study (excluding China), are listed in Table 5-1.

Without going into the details of these programs, there are a few observations that can be made about the list. The first observation is that not every country in the study had an explicit public program aimed directly at helping destitute people, such as India, the Philippines, Thailand and Uzbekistan. Instead, some programs were aimed at providing

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[7] Based on MCA (1999).

[8] According to the World Bank's estimation for 1998, which are based on household survey data of people in the world living on less than $1 per day (at 1993 purchasing power parity prices), East Asia and the Pacific account for 23% (with China accounting for 18%), and South Asia accounting for 44%. Figures are from Table 1, the World Bank (1999).

[9] They are: China, Fiji, India, Philippines, Republic of Korea, Sri Lanka, Thailand and Uzbekistan. Discussions here focus on experience on the other 7 countries other than China.

jobs, and access to factors of production, such as land and loans; others created employment opportunities for the poor.

The second observation is that many programs focused on the rural poor; for example, land reform in India, the Philippines and Thailand. The other two programs of poverty reduction in Thailand also focused on the rural poor. This is perhaps because in these countries, the majority of people in destitution live in rural areas.

Thirdly, except for Fiji, the Republic of Korea and Sri Lanka, which had some sort of direct relief for poor families, other countries in the study did not have a public program providing direct cash assistance to the poor.

Finally, there were few direct restrictions on eligibility for poverty reduction programs in these countries. Rather, the programs were designed to target different categories of people in need.

5.2.2 Poverty Reduction Experiences in Some Developed Countries during Their Early Development of the Market Mechanism

Since the Chinese economy is under the transition towards a market economy, the experiences of poverty alleviation in developed countries during their early stages of capitalism may be useful for China in dealing with its poverty reduction problems.

In many European countries, state interventions in poverty relief started and developed in the sixteenth century[10] (Birnie 1964). In England, as early as 1601, the law explicitly recognized the right of a destitute person to receive relief from the public authority. Until the Poor Law was established in 1834, the duty of poverty relief was put on local authorities? each parish was responsible for its own poor, and 'a destitute person could only claim to be relieved in the parish in which he belonged or in which he had acquired a settlement' (Birnie 1964: 201). In a sense, if the church is regarded as the analogy of the communist party and the parish as the analogy of the rural collective, the English arrangements look very similar to those in rural China during the pre-reform era[11].

[10] This section on poverty relief is mainly based on Birnie (1964), except where indicated otherwise.

Similar to various policies in China that limited labour mobility, the legislations in England at the time made it almost impossible for a man, especially a poor man to obtain a settlement. Each parish had the incentive to remove any new migrants if they were poor or had the possibility of being poor later, because they would increase the burden of poverty relief. In the meantime, 'the statute of apprenticeship obstructs the free circulation of labour from one employment to another, even in the same place. The exclusive privileges of corporation obstruct it from one place to another, even in the same employment' (Smith 1900: 122). Obviously, the poor laws in England also contributed to the obstruction of the free circulation of labour by effectively took away any opportunity for a person to move to another parish, no matter how better off he could be in the new parish. As Smith noticed, these policies created inequality between people in towns and those in counties. They also generated huge differences of wages in England, even between geologically nearby areas (Smith 1900). The poor, however, could not explore these benefits to improve their wellbeing by moving to another parish or another employment, due to these restrictive policies. In effect, the poor laws, along with other policies, effectively prevented poor people to use their labour to get out of poverty, by obstructing the free circulation of labour.

In England, it was not until the 1834 Poor Law Report that a national supervision institute for poor relief was established. However, it was still mainly the local authority—the parish that had the power to decide the level of the relief, and to whom and on what conditions it would be granted (Novak 1988).

The legislation of the French poor law resembled that of England during the sixteenth century. However, the French poor law statutes were not carried out by the central government until the nineteenth century. Prior to this period, it was up to local institutions (such as large hospitals) to provide voluntary poverty relief. When the compulsory system was introduced in the nineteenth century, four groups of poor gained a legal claim to relief: deserted and orphan children, the insane, the sick, and the aged. In 1905, new legislation introduced a system of allowances to three groups of poor: the aged (over 70), the infirm, and the incurable, with the grant determined by the local council within a fixed limit. Part of the cost came from the departments and the state, other costs from the commune. It is noticed that the system mainly concentrated

[11] Of course, the nature and the historical background of these two systems were very different.

on poor people in towns, meaning half of the country (rural areas) had no distribution of any poor relief.

Some of the initial German poor laws were also established in the sixteenth century, when each town was supposed to be responsible for its own poor. However, as in France, a regular system of poor relief did not exist before the nineteenth century. General principles of poor relief were laid down in a law of 1870, which left the application to the state government. Among various arrangements at the state level, the Elberfeld system was the most well known. In the town of Elberfeld, a few (initially six, then twelve) overseers were appointed to collect voluntary subscriptions and to assist destitute persons. Later on, a compulsory poor rate was introduced to finance the program. In this system, each application for poor relief was handled by an appointed visitor, who assisted the overseers by supplying written reports on the cases under consideration. The application and the visitor's report were then handed to the district council for approval. In addition, the visitor was responsible for examining the use of the relief, as well as visiting the recipient family regularly to check any changes of circumstances, if the recipient applied for further relief.

The experience in these developed countries shows that it takes a long time to recognize and form a formal public poor relief program. During the process, national legislation and supervision would help the reinforcement of the claim of the poor on the public authorities at the local or the national level. Given the fact that these countries still fight with poverty today, it indicates that poverty is very likely to be a long-term phenomenon. Public poverty alleviation programs need to consider both the poverty reduction effects in the short run, and incentive impacts in the long run. Their experiences of having poverty reduction administered by local authorities demonstrate that a locally based poverty reduction system may hinder labour mobility, and impose costs of economic efficiency on the whole economy.

5.3 The Background of the UMLS Program in Urban China

During the pre-reform period (1949-1978), with the HRS and other policies, migration in China was effectively curbed (See Chapter 3 and Zhao 2003) and almost all urban residents had their local household registrations. The social security system in cities was

designed to cover only these legal urban residents. It targeted two distinct groups among these residents: the majorities who belonged to work units, and the very small proportion who did not[12]. Since the family was the basic unit for social security assistance, families with at least one member employed were supposed to be taken care of by the work unit. For these urban residents, there was a comprehensive social security system, which by the late 1970s was funded and administered by individual work units. This work unit-based social security system covered the vast majority of urban residents[13]. For the rest of the urban population, the main public security service was the social relief program, financed by the government, and administered by the Ministry of Civil Affairs (MCA). The target for this social relief program was mainly limited to those legally registered urban people who did not have any of the 'three essentials': family, work unit, and source of stable income for a living. The number of people who were eligible for social relief was very small. This phenomenon remained until the introduction of the UMLS program in the mid-1990s (Tang 1998).

Table 5-2 shows the situation for regular relief under the urban social relief program[14]. From the mid-1980s to the mid-1990s, only a small number of urban residents received regular social relief from the MCA. In most of these years, recipients accounted for less than 0.1 per cent of urban population. Government expenditure on the social relief program was also small[15]. For example, in 1992, total expenditure for this program was only 87.4 million yuan. On average, each recipient received 38 yuan per month, which was equivalent to 25 per cent of urban per capita income that year (Tang 1998). This total expenditure accounted for 0.003% of GDP,[16] and 0.03% of budgetary revenue[17] that year.

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[12] See Chapter 3.
[13] As illustrated in Table 2-3, in 1978, about 80% of urban employees in state-owned and large collective work units (and their families) were covered by the LIR (or similar programs). Employees in small collective work units had similar but less generous social security programs.
[14] As discussed in Chapter 3, the social relief program included the relief for special groups, especially those whose poverty was due to government policies. For example, it covered workers that had been retrenched in the early 1960s.
[15] Detailed figures for the program over the years are not available.
[16] Calculated based on GDP figures in SSB (1999).
[17] Calculated based on government revenue figures in Lou (2000).

The social relief program was only one of the social security programs administered by the MCA[18]. Other programs included providing: jobs in welfare factories to disabled people; welfare homes for orphans, aged people without families, and people with mental illness; disaster relief; as well as assistance to veterans and their dependents. Among these programs, the social relief program came under increasing pressure following the economic reform, because its potential recipients had changed.

As discussed in Chapter 4, economic reform in China, especially labour market reforms and the reform of state-owned enterprises (SOEs), have undermined the old work unit-based social security system in cities. Following these reforms, the government job guarantee and lifetime employment arrangements collapsed; the private sector has been growing while the public sector has been shrinking. Within the public sector, reforms have been aimed at releasing firms from the obligations of providing social security services to their employees. In summary, before the establishment of the UMLS program during the period between the early and the mid-1990s, the following groups of people could potentially fall below the poverty line in cities.

(1) Unemployed, especially long-term unemployed people and their families. Competition in the labour market and structural adjustments of the economy under the transition inevitability bring unemployment. People who were employed outside the public sector were particularly vulnerable, since the unemployment insurance did not cover them (see Chapter 4). Since the early 1990s, the SOE reform has deepened and a large number of employees of SOEs were laid-off. Although these workers no longer worked for the SOEs, they were not immediately regarded as officially unemployed. Instead, they were looked after by the reemployment centres within SOEs for a period up to three years or until they found another job. During this period, they received living stipend and other social insurance benefits (see Text Box 4.1 in Chapter 4). However, income of these laid-off workers was often reduced significantly and they and their families might experience hardship.

[18] As mentioned in Chapter 3, the MCA also manages other civil affairs and services, such as burial services, marriage and dependents services; civil education and public administration, etc (Shao and Chen 1991).

(2) Poor family members of employed people. Reform of SOEs meant that firms were no longer required to take care of the poor families of their employees and retirees. Poor families of employees and retirees had no resort for help, under the old arrangement, from the urban social relief system. These families, usually having members on low wages, and/or with high dependency ratios (the ratio of dependants and income earners of the family), or with disabled family members, were the most vulnerable. Their basic living could be threatened by many factors, such as diseases.

(3) Inflation could drag some low-income families into absolute poverty. When wages and pensions were not indexed to the cost of living, inflation significantly reduces people's living standards. Figure 5-1 shows annual inflation rates in China during the 1980s and 1990s, as measured by the urban consumer price index. During the period between the late 1980s and mid-1990s, the annual inflation rate reached over 20%. Since there was no mechanism at the time to index wages and pensions to the cost of living, these rapid rises in living costs pushed many urban families into poverty (Tang 1998).

(4) The previous three groups of vulnerable people in urban China were legal residents of cities. Another, even more vulnerable, group had emerged in cities since the mid-1980s. They were mostly rural migrants who did not have the local household registrations. Migration within China, especially from poor to rich areas, and from villages to cities started in the 1980s, as a result of the relaxation of *de facto* controls over migration followed the reforms (Nolan 1993). Most of these migrants were 'poorly educated, relying mainly on physical strength to ensure employment' (Nolan 1993: 1373). It is also found that city governments were very reluctant to grant permanent rights of settlement—local household registration—to migrants 'for fear that this will impose a long-term burden on welfare resources' (Nolan 1993: 1373). These migrants did not have the legal rights to stay in cities and were often discriminated against in employment (especially in the public sector), and usually worked in very poor working conditions with little or no labour protection. The lack of legal residency also excluded them from social security benefits that were available to legal residents from the city government where they stayed (Zhao 2003).

These vulnerable groups became large with the progress of reform, especially since the early 1990s. For instance, Table 5-3 lists official figures of registered unemployment[19] and laid-off workers in urban China during the 1990s. Clearly, there was a rising trend of unemployment rates in cities during this period. The table also lists official figures of laid-off workers from 1996 to 1999, which include only those laid-off employees who were not reemployed at year-end. The actual number of laid-off workers, including those found new jobs later, was obviously even larger. Table 5-3 shows that the proportion of urban people who did not have jobs, including both the registered unemployed and laid-off workers, in urban labour force was around 7% in 1990 as well as during the late 1990s. The actual figures could be higher, for example, some unemployed did not register with the government. Both the officially unemployed people, who were eligible for up to 24 months unemployment benefits if they were qualified (see Chapter 4), and laid-off workers, who only received a living stipend for up to three years, and their families could easily fall into poverty if they had not already done so. A study of Zhang and Wei (1999) using urban household survey[20] data in 1988 and 1995 finds that (head count) poverty incidence[21] increased from 4.2% in 1988 to 11.25% in 1995. In addition to the poverty among legal urban residents, the number of rural migrants in cities was also rising and their income were more likely to be lower and unstable (see more discussions in Section 5.5.2).

Studies of poverty among legal urban residents also indicate that the composition of these poor families has changed (Atinc 1997; Li, Chen et al. 1999). In addition to the 'traditional' recipients of the social relief program, that is, those who have been receiving support from the urban social relief program prior to the reforms, a very large proportion of urban poor come from families of low-income employees and retirees. Table 5-4 summarizes figures from surveys about urban poor in China conducted by the local MCA in some cities and provinces. The main observation from this table is that only a relatively small proportion of the urban poor were 'traditional' recipients of the social relief program, while poor employees, retirees and their families dominated the urban poverty group in the late 1990s. For example, in Xining city, more than 50% of

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[19] The official figures of unemployment only include those urban residents with local household registrations and were registered as unemployed. Laid-off workers of SOEs were not included.
[20] Both household surveys were designed by China Academy of Social Science (CASS) and conduced by the urban survey team of the State Statistical Bureau of China.

the urban poor were employees and retirees and their families. In Hebei province, more than three quarters of urban poor were employees and retirees. Part of the reasons why workers were below the poverty line was the default on wages and pensions by some SOEs that had financial difficulties. Table 5-5 shows some figures for urban employees/retirees whose employers had partially or fully defaulted on their wages/pensions (at year end) for selected years. Without further information about these defaults, such as duration and amount, it is impossible to estimate their impact on these people and their families' living standards. However, one can imagine that these defaults could have caused hardship for both these employees/retirees and their family members.

In addition to its limited coverage, the old social relief program had another problem: the amount of assistance provided was very limited. For example, in 1994, poor family relief was 421 yuan per person, which was only 14 per cent of per capita annual income in cities that year (Wang 1996).

Although the scale of urban new poor had become significant by the mid-1990s, the old social relief program did not provide much protection. Social and, particularly, political pressure pushed for government to respond to the problem of the emerging urban poverty and to reform the old safety net. The UMLS program was introduced in the late 1990s, followed experiments in a few cities. Its target group is poor urban residents who have local household registrations, regardless of age, working capacity, employment status, and employment history. However, the program does not cover migrants in cities who are not legally recognised as residents. This is an important defect of the program, which will be discussed further later in this chapter.

5.4 The Urban Minimum Living Security (UMLS) Program

This new social safety net program was initiated in Shanghai, one of the biggest cities in China, by the municipal government in 1993. Shanghai's experience was later extended to all urban areas by the central government in September 1997 (Zheng, Wang et al. 2000). By 1999, the program had been implemented in all city areas and counties[22], and

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[21] They choose the formula designed by Foster, Greer and Thorbecke (FGT) to calculate the poverty incidence. The poverty line is based on food consumption.
[22] Based on MCA (2000b).

the 'Regulations for Urban Resident's Minimum Living Security' (the Regulation) was implemented as the national legislation for the program (Kang and Feng 2000). The Regulation stipulates sources of funds, the coverage of the program, and eligibility for relief. It also defines the meaning of 'the minimum living security'. The MCA is responsible for the national administration and supervision of the program. Each city government is responsible for the implementation of the Regulation, including determining the local UMLS level and delivering the cash assistance, with regulations and coordination by the provincial government.

According to the Regulation, the amount of relief for an UMLS recipient family is calculated by the following formula:

Total relief in yuan = Local UMLS line * number of household members - Total calculated household income

(5-1)

The 'total calculated household income' may not be the same as the 'total actual household income'. How to define this term obviously has important implications for the effectiveness of the poverty relief program, both for recipients and for the local government. This and other relevant issues of the program are explained in details below.

5.4.1 Establishing the Right of Legal Urban Residents to Claim for Poor Relief

The Regulation establishes the legal right of the local urban poor—those who have the city's household registrations—to claim from their local authority? the city government? for the defined minimum living security, if their household per capita income[23] is below the specified level. Similar to the British poor relief system before the 20th century, in this program, the poor can only claim on their local authority—the city government where their household registration is—in the Chinese administrative hierarchy. In China, the municipal government can easily identify whether the residents have the legal right for a claim or not by checking their household registration. As mentioned in Chapter 3, Chinese households are broadly grouped into 'agriculture

[23] The income is defined broadly, including both incomes in cash and in kind, etc. It is discussed further later in this section.

registration' and 'non-agriculture (urban) registration'. In each group, as legal local residents, each household is also registered locally in village and county for those with agriculture registration, or town and city for those with urban registration. Migration has always been difficult, especially if people wanted to change their household registration. For example, people registered as Beijing resident want to move and settle down in another city, say Nanjing, must apply through the public security bureau in Nanjing, to be registered as Nanjing residents. If they do not apply or fail to be accepted as Nanjing residents, they will not be eligible for the UMLS relief from the Nanjing government, even if their household income is below Nanjing's UMLS line and they physically live in Nanjing.

From a migrant's point of view, although the *de facto* control over migration has been relaxed since the economic reform, and a large number of migrants have moved to cities to find jobs, obtaining the legal residency in the city they live is still very difficult and rare (Nolan 1993; Li 2001). Without local household registration, migrants have no legal right to claim for support on the local authority where they live. For migrants who are legal residents of other cities, they have access to the UMLS support from their city of origin where their household registration is located. For migrants who hold agricultural registration back in their villages, they have no legal right to any UMLS safety net[24]. For these people, their last resort is to go back to their village of origin and live on the piece of land they rent from the village (Wen 2000; Zhao and Wen 1999).

This feature of the current UMLS program that the city government only provides poor relief to households with local household registrations has some important implications. These will be discussed in Section 5.5.

In practice, there is some exclusion with regard to those who have broken government rules, or those who are clearly not poor. The main categories of poor people that were excluded in some cities/counties in 1998 are summarized as follows[25] (Zhou 1999):

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[24] There are few cities have extended their UMLS to nearby rural areas during recent years. One example is Beijing City.

[25] The categories are summarized by the author based on government documents for selected cities in 1998.

- ❖ Unemployed or laid-off workers who had twice refused to take up jobs found by the re-employment centre;
- ❖ Households that had violated the one-child policy;
- ❖ Households that had become poor due to the criminal behaviour of their members;
- ❖ Households that had luxury consumer goods valued at more than 3000 yuan, and households that owned cash, bank deposits and securities with a total value of more than 1200 yuan[26].

According to the Marriage Law in China, there are three main obligations of financial support among family members (Gao 2000): (1) parents are liable for bringing up their children, and children are liable for their parents in old age. Thus, parents are supposed to look after their children who are not yet grown up, while grown-up children have a financial obligation to support their parents, if the parents' income is low; (2) grandparents have an obligation to support grandchildren whose parents pass away; and grandchildren have an obligation to support grandparents whose children pass away; (3) grown-up siblings are liable to support under-age siblings, if the parents pass away or the parents do not have the capability to support these young children.

The stipulation about financial support among family members affects a household's eligibility to receive poor relief. To make thing seven more complicated, the Marriage Law does not specify how much these financial liabilities should be, and this leaves loopholes in practice. Many city governments stipulate that only when people with liabilities cannot afford to pay, that is, when their own household income is below the city's UMLS line, does the liability no longer apply. Otherwise, the part of the household income that is above the local UMLS should be paid to their legal dependants whose incomes are below the UMLS level. In practice, how much and whether the liabilities are actually paid adds another complication to calculating household income.

5.4.2 Calculating Household Incomes

By the definition of the Regulation, the 'total calculated household income' includes all actual monetary and in-kind incomes of all household members, as well as all sorts of income that household members are entitled to according to relevant laws and legislations, such as the Marriage Law. Finding the 'total calculated household income' is complicated, not only because the detailed definition varies across cities, but also because it often includes both actual and entitled income. Taking Hefei City as an example[27], household incomes include wages, bonuses, inheritance, price subsidies, pensions, unemployment benefits, medical insurance benefits, incomes from other social welfare programs, all other labour income, gifts, income from portfolio and bank deposits, income from relatives who have the legal liability to support the family members, college student living subsidy, and income from student's part-time jobs.

Among this list, there are some types of income that need to be explained further. For instance, it is assumed that people who are employed or retired do indeed receive their entitled wages or pensions, which are equal to or above local minimum wages[28]. In other words, the assumption is that all employers abide by the minimum wage law. It is also assumed that laid-off workers receive their minimum living stipend from the reemployment center and unemployed people receive unemployment benefits[29]. In addition, during 1998 and 1999, some cities assumed all able-bodied males aged between 18 and 60, and females aged between 18 and 55 received the local minimum wage, on the grounds that people might not be honest about their actual income from self-employment or part-time jobs (Liao 1999; Wang 1999a; Liao 2000). Although there were people who hid their incomes, these assumptions could have led to over-estimation of actual household incomes for people who were unemployed or worked at lower than the minimum wages. As shown in Table 5-5, there are large numbers of laid-off workers and retirees who did not receive full wages or pensions during the 1990s,

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[26] 3000 yuan = US $360, 1200 yuan = US $145 in 1998, according to the official exchange rate.
[27] Hefei is the capital city of Anhui Province, located at East China. The information comes from author's interview with local MCA officials during the fieldtrip in February 2001.
[28] The Ministry of Labour issued 'Regulations for Minimum Wages of Firms' in 1993 (Kang and Feng 2000). The minimum wages are determined by the provincial government. It is not clear how extensively this legislation has been reinforced at firm's level. However, the UMLS line is supposed to be lower than the local minimum wages.
[29] Details of minimum living stipend from the reemployment centre and unemployment benefits are discussed in Chapter 4.

and some might receive nothing at all (Wang 1999a; Gao 2000). This assumption of full employment and full compliance with the minimum wage standards certainly would contribute to overestimation of household incomes.

5.4.3 The Level of Urban Minimum Living Security

The UMLS line, or the level of Urban Minimum Living Security, is determined by the city government. According to the definition of the Regulation, it includes the cost of basic food, clothing and shelter, with some consideration of the daily expenses of water and electricity, as well as children's compulsory education costs. It should be stressed that the UMLS is only designed to help the poorest households to survive, by providing the minimum subsistence need. It does not include expenditure such as medical services.

There is no nationwide formula for calculating the UMLS level. Since the program was established, local UMLS lines have been increased, despite relatively stable living costs in cities over this period[30]. For example, the UMLS line in Beijing, which was 179 yuan/month per person in 1998, was adjusted to 290 yuan/month per person by July 2002. Among 35 other cities (including most capital cities) that adjusted their local UMLS lines in July 2002, the lowest was 143 yuan/month per person (Nanchang City), and the highest was 344 yuan/month per person (Shenzhen City), with an average level at 207 yuan/month per person[31].

The central government may intervene in the determination of UMLS of cities. For example, the State Council ordered municipal governments to raise the UMLS standards by 30 per cent in July 1999, as part of ongoing efforts to increase domestic demand (Zheng, Wang et al. 2000).

The UMLS standard varies from city to city, due to the significant and increasing gap between regional development and standard of living (Zhao, Li and Riskin 1999; Lin 2000). The second column of Table 5-6 lists the UMLS line in 1999 for capital cities of

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[30] Urban CPI for the four years between 1998 and 2001 is 100, 98.7, 99.5 and 100, respectively (SSB, 2001; SSB 2002). In 1998, the exchange rate between Chinese yuan and US dollar was $1=yuan 8.28.
[31] The figure for 1998 is from Zheng, Wang et al. (eds.) (2000). Figures for 2002 are from MCA (2002a).

Chinese provinces. The highest level was 312 yuan/month in Guangdong, while the lowest level was only 130 yuan/month in Ningxia and Jiangxi. Whether the provision is adequate for the urban poor requires careful studies using more detailed information of individual households.

5.4.4 Financing the UMLS Program

The source of funds for the UMLS program is municipal government's budgetary revenues. Each city determines its own UMLS level and pays the poverty relief through local MCA bureaus. In practice, during the first few years of the program, many local governments, especially those in large cities, shared the cost with lower level authorities. For example, some municipal governments and district governments[32] shared the costs of the program in the proportion of 7:3 or 6:4 (Liao 1999; Gao 2000). There were also cities (such as Beijing and Liuzhou) that required work units to pay UMLS recipients who were their employees/retirees. However, by 2000, this phenomenon had been largely corrected.

The central government has been standing by to help local governments in establishing the UMLS program, especially in those provinces where the local governments have difficulties in meeting the demand for poverty relief (Liao 1999). For example, budgetary appropriations from the central to lower level governments for the UMLS program were 0.4 billion yuan in 1999. This accounted for 17 per cent of total poverty relief from the program that year[33].

There are reports that due to tight budgets, some local governments had to reduce the level of the UMLS (Wang 1999a). A survey was conducted in April 1998 in 22[34] out of 31 provinces in China. The UMLS chosen was between 70 to 120 yuan/month per person, whereas? according to the central government regulation—it was supposed to cover estimated minimum living costs, which were between 90 and 150 yuan/month per person. The survey also showed that only 910 out of 2600 thousands, or 35 percent of

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[32] The urban administrative hierarchy has not changed since the economic reform. See Figure 3-3 for the urban system.
[33] Calculated based on figures from the MCA (2000c).
[34] The 22 provinces did not include rich provinces and cities under central administration, such as Guangdong and Shanghai.

poor people who would have been recipients of the program actually received any assistance[35]. It seems that in 1998, the UMLS program was not effective in helping all poor families. The major reason was the lack of funds at the municipal government level.

5.5 A Preliminary Assessment of the UMLS Program

A formal and comprehensive assessment of the impacts of the current UMLS program needs, at least, to examine its effectiveness of poverty reduction as well as its influences in the labour market. This requires appropriate data, especially at the household level. Due to the lack of such data, this section only provides some preliminary evaluations of the program. Firstly, some aggregate figures are used to show how the program expanded during the first few years after it was implemented. It is followed by some analysis of two important defects of the UMLS program that cause concerns for its development in the future: (1) the limited coverage of the program and its potential impact on labour mobility and poverty reduction, and (2) the distorting feature of the program: a high marginal tax rate on earned income of recipients.

5.5.1 The Progress of the UMLS Program in Providing Poverty Relief

Table 5-7 lists some national aggregate figures of the UMLS program between 1998 and the first half of 2002. The UMLS program has been providing poverty relief to more and more urban residents since 1998[36]. The proportion of UMLS recipients in the urban population[37] was 0.5 per cent in 1998, and rose to 2.44 per cent in 2001. The significant increase of recipients in 2001 may be due to the fact that this was the first year a large number of laid-off workers left the reemployment centers and became recipients of the UMLS program[38]. The cost of the UMLS program also rose rapidly. However, part of the dramatic increase in costs in 1999 was due to the State Council's

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[35] Usually the city government added other conditions to restrict limited funds to the poorest households. Some local governments refused to provide relief to employees/retirees of SOEs directly belonged to the central government, arguing that taxes from these SOEs were paid to the central government (Gao 2000).
[36] Due to the lack of data, the proportion of urban poor that were actually covered by the program is not clear.
[37] Urban population is defined as those with urban household registrations.
[38] Recall from Chapter 4, large-scale laid-off workers entered employment centres since 1998 with the 3-year contract. Many of the contracts expired in 2001 and those laid-off workers had to leave the reemployment centres.

decision to increase all UMLS standards by 30 per cent in July 1999 (Zheng, Wang et al. 2000).

During the first few years of the program (1998-2002), the Chinese central government put a lot of emphasis on implementing the UMLS program. It emphasized the supervision by the MCA, and also contributed to costs of the program for poor local governments. In July 2002, the MCA claimed that all 19.3 million urban poor who were supposed to receive cash payments from the UMLS program had been covered by the program. The total cost of the program for the first six months in 2002 was 10.5 billion yuan, among which 4.6 billion yuan, or 44 per cent, came from the central government budget[39]. These supervision and financial support from the central government have certainly contributed to the increasing coverage of the UMLS program. The political commitment is also a positive sign for future progress of this program.

At the city level, a simple empirical exercise is carried out, based on data collected by the author, for selected cities during the period between 1996 and 1998. The exercise is summarised in Appendix 5.1 at the end of this chapter. A few observations emerge from the sample cities during this period.

1. Among the 96 sample cities, the UMLS standard varies significantly across cities and time. The mean value of the UMLS line is 120 yuan/month, with the minimum of only 68 yuan/month and the maximum of 230 yuan/month (Table A5.1-2).
2. The UMLS standard shows strong and positive correlation with the average urban wage of the city, and per capita revenue of the municipal government, while it is negatively related to the official unemployment rate of the city (Table A5.1-3).
3. The econometric test shows that, the UMLS level reflects differences of living costs and income disparities among cities, and the level of poverty relief is constrained by the city government's budgetary revenues, although the impact seems to be very small.

These aggregate figures and this city-level study suggest that the UMLS program has made important progresses during the first few yeas after its introduction. The UMLS standard appears to reflect regional differences in living standard. However, local government budgetary revenues seem to have imposed a constraint to what level the

local UMLS line was. This raises concerns that whether in some poor cities, the guaranteed income may be set too low to meet even the basic need of the poor.

5.5.2 The limited Coverage of the UMLS Program and Its Potential Impact on Labour Mobility and Poverty Reduction

While the coverage of the current UMLS program has been expanding since it was introduced, the design of the program has a few important features that need to be studied and reformed. This sub-section looks at the first one of these features.

5.5.2.1 The Limited Coverage of the UMLS Program

The coverage of the current UMLS program is limited to local, legal urban residents registered according to the household registration system. It excludes all migrants who are not official local urban residents. These migrants can be broadly divided into two groups. The first group includes migrants from other cities, and the second group includes rural migrants.

In principle, poor people of the first group could claim poverty relief from the municipal government where their household registrations are located. In practice, it is very likely that this cross-region claim incurs additional costs to the poor, but it is not clear how high these costs may be.

The second group, often referred to as 'the floating population' in Chinese cities (see Appendix A5.2.1), are totally excluded from the coverage of this safety net[40], even though they work and live in cities. The number of the floating population has been rising since the mid-1980s, with the relaxation of the household registration system. Despite local policies that discriminate against them, better life and more economic opportunities in cities have attracted millions of farmers to cities, especially large cities (see Appendix A5.2.2). It is estimated that there were one rural migrant in every 4-5 urban residents in Chinese cities around 2002 (see Appendix A5.2.2). These people mainly work on low-paid jobs and are denied of equal access to all sorts of social

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[39] Figures are from the MCA (2002b).
[40] In recent years, some rich cites, such as Beijing and Shanghai, have established rural minimum living security program to provide a safety net to local rural residents.

security and welfare benefits that are available to local urban residents. Compared to the local people who are registered as residents, the floating population are much poorer and have little protection from the local government. The background and the situation of the floating population are discussed in Appendix 5.2 to this chapter.

The exclusion of the large number of migrants from the UMLS program defeats the stated purpose of the program, which is to provide a minimum living security for all urban residents. Given that these migrants contribute to the urban economy and therefore the government budgetary revenues, they should be entitled to benefits of this safety net.

5.5.2.2 The Potential Impact on Labour Mobility and Poverty Reduction

The exclusion of migrants from the UMLS program has potential impacts on different aspects of the society. For example, it may cause political instability. From the economic efficiency point of view, the main adverse impact is on labour mobility. Lack of labour mobility can hinder poverty reduction, which is the very purpose of the UMLS program.

The adverse impact on labour mobility is twofold. Firstly, the current UMLS program leaves poverty relief to the local authority, especially the municipal government. It can be expected that similar to the parish in British poor relief before the 20th century, the Chinese city government has the incentive to deny poor migrants from coming to the city. Based on the current institutional environment in China, the easiest way is to deny migrants of their legal residency in the city. Secondly, it discourages the poor to explore economic opportunities in other regions. The urban poor would be more reluctant to move to other cities or provinces to find employment opportunities, even if there is lack of opportunities for them in the city of their household registration. This is because it will be costly for them to apply for the UMLS relief from other places to their originating city government. For the rural migrants, the lack of a minimum safety net in cities adds more uncertainty for their decision to move to cities. It also makes it difficult for them to leave their land, because it is regarded as the ultimate safety net.

Both the lack of incentive to open household registration by the municipal government and to move to explore better employment opportunities by the poor hinders the 'free circulation of labour' (Smith 1900). As a result, they effectively prevent poor people to get out of poverty by exploring the best use of their labour.

5.5.3 The Implicit High Marginal Tax Rate of the UMLS Program

The current UMLS program is based on a very simple idea that a minimum income is guaranteed for all urban residents who have the local household registration. However, the design of the program has a distorting feature, which is that its recipients are taxed heavily. As shown in equation (5-1), as recipients of the poverty relief, the amount of cash received from the program is negatively related with their household income. More precisely, when household income is increased by one yuan, the recipient household will lose one yuan from the UMLS program. This feature effectively imposes a marginal tax rate up to 100% on recipients' earned income.

This feature is shown in Figure 5-2 for a recipient household in a given Chinese city. The household's income (yuan/month per capita) is drawn on the horizontal axis, and the UMLS relief that the household is eligible for (yuan/month per capita) is drawn on the vertical axis. M represents the UMLS line of the city. When the household (per capita) income is zero, each household member receives the maximum amount of poverty relief from the UMLS, M yuan/month. When the household per capita income is above the UMLS line, M, it receives no poverty relief. When the household income is between zero and M, for each extra yuan per capita it earns, it loses the same amount of poverty relief from the UMLS, thus the slope of the budget line for the recipient household is 45-degree. For this household, the trade off between earned income and cash payment from the UMLS program is 1:1. Effectively, every yuan of earned income that is below M is taxed. The recipient household is not financially better off by earning more income, so long as it remains a UMLS recipient.

Of course, this 100% marginal tax rate would be lower or even irrelevant, if there is an effective minimum wage in place that is much higher than the city's UMLS line, and if part-time work is not available. Currently, regional disparity is so large in China that this high marginal tax rate is likely to present only in some rich cities. In an official

document called 'Issues of Pilot Projects to Perfect Urban Social Security System' by MOLSS (2001a), it is stated that one of the problems of the UMLS program in 2000 was that the UMLS lines were uneven among cities. It points out that 'in some cities, the UMLS lines were too high, while in others, they were too low'. It urged the municipal governments to design the UMLS lines so that it 'ensures a basic living for the urban poor, but still encourages employment' (MOLSS 2001a: 515).

For regions where minimum wages are set and implemented[41], the current gap between the minimum wage and the UMLS line may not be big enough to eliminate the disincentive impact of this program. Studies of the relationship between the minimum wages and the UMLS lines are rare. Table 5-6 compares the provincial minimum wages and the UMLS line in the capital cities in 1999. On average, the UMLS line was about 60% of the minimum wages in 1999. Take this figure and suppose that the average family size was 3 people[42]: two parents and one child. Suppose only one parent worked in 1999 and received the minimum wages and the family had no other income, then the per capita income of this family was about 56% of the local UMLS line. Therefore, this family was eligible for the UMLS poverty relief and faced a tax rate of 100% on any family earnings.

However, for some unemployed people, the relevant choice is between full-time employment and unemployment. For such people, the effective rate of tax on earned income is less than 100%, particularly if minimum wage rates are actually enforced. For example, using the figures for the UMLS line and provincial minimum wage rates in 1999, a fulltime job at the minimum wage for a month would typically pay about 67% more than the monthly UMLS benefit. As a result, the average effective tax rate facing a person choosing between the UMLS benefit and full time employment at the minimum wage would be 60%, not 100%. This is still a very high and distorting implicit tax.

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[41] In China, the legislation of minimum wages was issued in 1993 (Kang and Feng 2000). The provincial government decides the minimum wages for the province and adjusts it (at most) once a year according to factors such as changes of living costs. By 1996, 29 out of 31 provinces in Mainland China (except Tibet) had established local minimum wages (MOLSS 1996).

[42] The average family size in 1999 was 3.14 persons (SSB 2000b).

This feature of high marginal tax rate has disincentive impact on labour supply. Even for cities where the UMLS lines are currently low and the disincentive impact is very limited, it is important to be aware of this potential adverse impact in the future. It is likely that this impact becomes more significant when the economy grows and the UMLS standard increases over time. Careful empirical studies are needed to examine the actual impact on labour supply of the UMLS program. Reforms should follow if this impact is significant.

From the government's point of view, an efficient approach to provide the social safety net for the urban poor is the one with the minimum costs. One way to achieve this efficiency object is to minimise the number of people who rely on the poverty relief, *ceteris paribus*. For this purpose, the design of the safety net must consider its disincentive impact on people's effort to find jobs.

5.6 Conclusions

This chapter has examined the background, reforms, and the practice of the new program of the Chinese urban social relief system—the UMLS program. The UMLS program is an important part of the social security system reform in China, since it is the foundation of the current and future social safety net for the urban poor. This program was designed to provide a guaranteed income to all urban people—but only those who have the local urban household registration. The UMLS program was established by the central government in the late 1990s, and had been implemented by municipal governments in all urban areas by 1999.

Since the UMLS program is administered by the municipal government, detailed rules vary across regions. Since this is a relatively new program, relevant data and studies are rare. The preliminary assessment in this chapter has focused on two aspects. The first one is the progress of poverty relief of the program during the first few years of its implementation. The national aggregate data show expanding coverage of the program, along with increasing number of recipients and amount of budgetary expenses. This suggests that an increasing number of people were benefit from this program. The issue is also investigated using a sample of 96 cities during the 1996-1998 period. The sample shows large variations of the UMLS standard across cities and over time. A simple

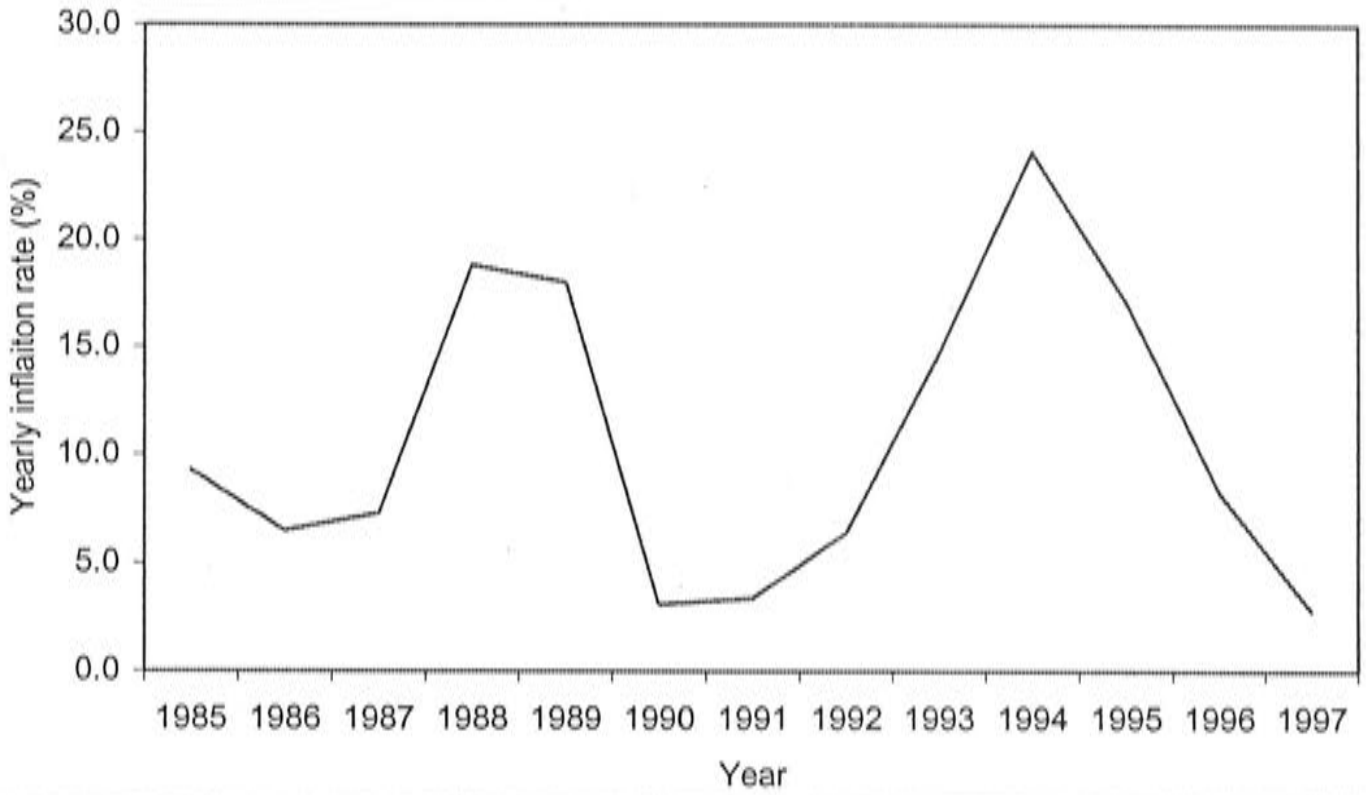
empirical test is carried out as a preliminary attempt to assess the performance of the UMLS program at the city level (see Appendix 5.1). The results show that both the living costs and income disparities in the city have significant impact on the city's UMLS level, with the former being positive and the latter being negative. While the city government's budgetary revenues (per capita) are a statistically significant constraint on the city's UMLS line, the magnitude appears to be fairly small. Couple of reasons are suggested for this small impact of budgetary revenues.

Discussions of the second aspect for the assessment focus on the major defects of the current program: (1) its limited coverage has the potential to restrict labour mobility, and therefore hinders poverty reduction by the poor exploring economic opportunities across regions; (2) the program has a very high marginal tax rate on earned income of its recipients, which may have disincentive impact on labour supply. This disincentive impact may not be important for relatively poor cities where the UMLS line is set low. However, it has caused concern of the government for rich cities.

The UMLS program was designed to provide a safety net for all urban residents in China, irrespective of their age, sex, employment history, etc. It appears to be the government's short-term response to the emerging urban poverty problem during the economic transition. However, in the long run, these adverse impacts on labour mobility and labour supply can have significant impacts on people's decision-makings. For example, the distorting feature of a 100% marginal tax rate on recipients' earned income can easily create the so-called 'poverty trap' (Hemming, 1984), and gives incentive for the poor to rely on the program, rather than searching for paid jobs.

More studies are needed for further reforms to correct these defects of the current UMLS program. Experience of poverty relief in other countries, as summarised at the beginning of this chapter, is useful for exploring reform options. Other options should also be considered. For example, the adequate provision of eduction to children of poor families is an important way to help them to gain human capital and get out of long-term poverty. In the long run, poverty reduction in urban China should aim at providing a basic safety net for all the poor, while creating no significant distortions to the private economy.

Figure 5-1. Infaltion Rates in China during the 1980s and 1990s



Source: Author's construction based on SSB (2000b).

Figure 5-2. A 100% Marginal tax Rate of the UMLS Program

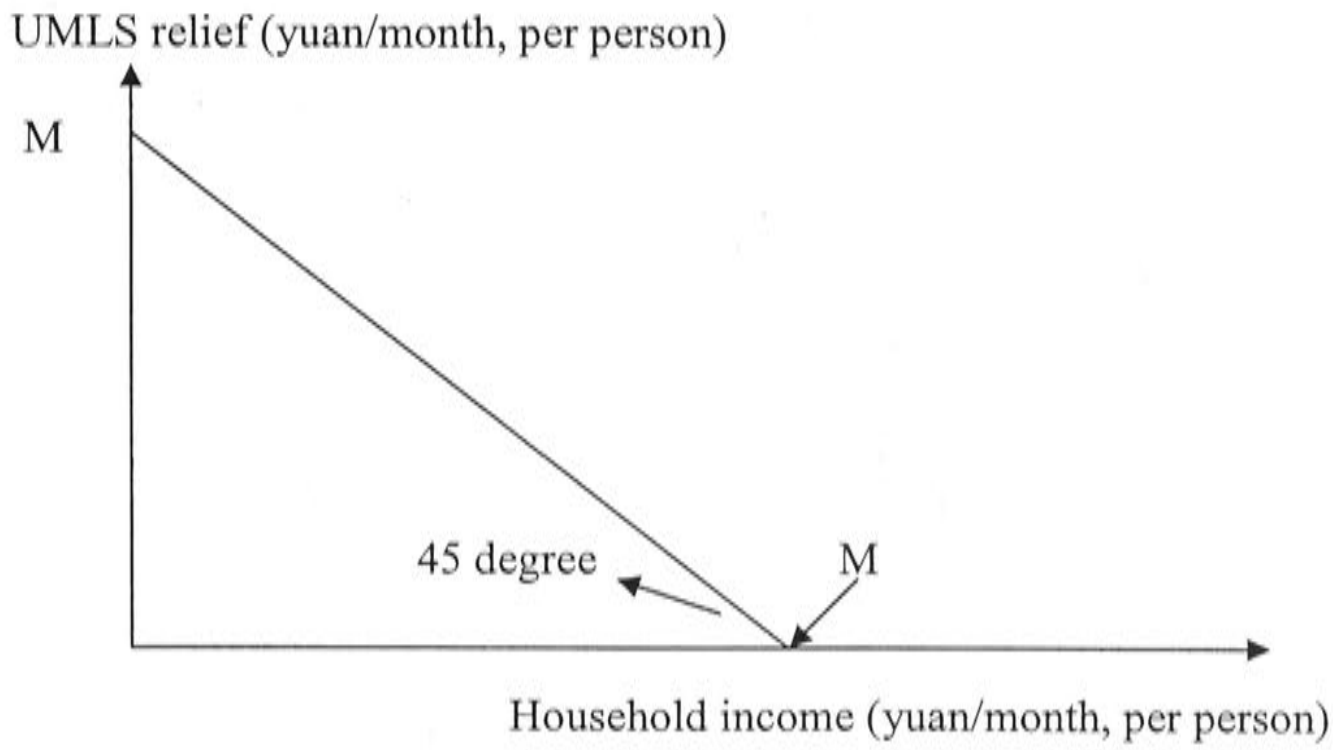


Table 5-1. Major Poverty Alleviation Programs in 7 Countries in the Asia-Pacific Region

Country	Major Programs
Fiji	(1) Family allowance—temporary assistance for destitute families (2) Assistance to elderly and disabled persons who also receive services from other government agents, such as the Ministry of Health.
India	(1) Land reform; (2) Employment Guarantee Scheme: provide jobs for the poor at a wage below the market rate; (3) Public distribution system: food rations through a national network of fair price shops, covering both poor and non-poor; (4) Integrated child development services: a package of services for pregnant and nursing mothers and children under the age of 6.
Philippines	(1) Land reform: for security of tenure and redistribution of land; (2) Credit for the poor: loans for income-earning activities to the poor.
Republic of Korea	(1) Livelihood assistance: covers the elderly, orphans, the disabled, and women in need, etc. (2) Medicaid: free health care and funeral grants for those receiving livelihood assistance; (3) Social welfare services: institutional care, job training, counseling and monthly allowances for the needy people.
Sri Lanka	(1) Samurdiya program: family allowance based on income; (2) Relief: monthly relief to the destitute, and people affected by civil disturbances, refugees, etc; (3) Institutional care: the elderly, the disabled and orphans
Thailand	(1) Land reform: providing land ownership to the poor; (2) Public work program: rural job creation during the slack season (3) Rural development policy: improving the living condition of the poor
Uzbekistan	Increasing expenditure on social protection, and raising minimum wages in accordance with inflation

Source: Based on United Nations (1996).

Table 5-2. Urban Social Relief Recipients during the 1980s and Early 1990s

Year	Urban population (million persons) (1)	Recipients with regular relief[a] (10,000 persons) (2)	Proportion Of urban population[b] (2)/(1) (%)
1984	240.17	24.5	0.10
1985	250.94	18.2	0.07
1986	263.66	35.6	0.14
1987	276.74	16.2	0.06
1988	286.61	17.6	0.06
1989	295.4	16.2	0.06
1990	301.91	16.4	0.05
1991	305.46	16.1	0.05
1992	323.72	19.2	0.06
1993	333.51	13.8	0.04
1994	343.01	12.4	0.04
1995	351.74	12.7	0.04

Note: a. regular relief is one of the two parts of the social relief program. The other part is temporary relief. The figures in this column are the product of the numbers of recipients times the number of times receiving the regular relief, therefore the number of people benefited is not clear.

b. figures in this column provides a rough idea of the scale of the people received regular relief from the MCA.

Source: author's calculation based on SSB (various years).

Table 5-3. Registered Unemployment[a] in China during the 1990s

Year	1990	1997	1998	1999
Number of unemployed (million persons)	3.8	5.8	5.7	6.0*
Number of laid-off workers at year end (million persons)[b]	8.15[c]	6.34	8.92	9.37
Urban labour force (million persons)	166.16	202.07	206.78	210.14
% of labour force out of work[e] (%)	7.2	6.0	7.1	7.3

Note: a. Unemployed does not include laid-off workers of the SOEs;
b. Figures include all laid-off workers still unemployed at year-end;
c. This figure is for 1996.
e. This is the total number of officially unemployed and laid-off workers divided by the urban labour force.
* estimation from author's discussion with Chinese economist.
Source: 1. SSB (2000a).
2. Figures for laid-off workers are from MOLSS (various years).

Table 5-4. The Structure of Urban Poor in China (based on surveys in some cities and provinces)

Province/cities	**Xining City**		**Dalian City**		**Hebei Province**		**Ningxia Hui**	
Time of the survey	Dec-1995 to Jan.-1996		March-1998		Sep.-Nov. 1997		Sep.1999	
Total urban poor[a] (1000 persons)	Number (1000)	Share (%)	Number (1000)	Share (%)	Number (1000)	Share (%)	Number (1000)	Share (%)
Traditional "without the three essentials"	0.53	2.3	0.68	2.0	14.23	11.4	6.18	8.2
Other unemployed	-	-	4.41	13.0	15.46	12.4	26.14	34.6
Employees/ retirees	11.74	51.0	14.86	43.8	95.42	76.3	38.10	50.5
Others[b]	10.75	46.7	13.96	41.2	-	-	5.05	6.7
Total	23.01	100.0	33.91	100.0	125.11	100.0	75.47	100.0

Note: a. the poverty line was different for each city at the time of survey.
b. This category mainly includes family members of poor families;
Source: author's construction based on MCA (1999). Number of persons includes family members. The number of employees/retirees includes retrenched workers. The criterion of urban poor is different in different cities/provinces.

Table 5-5. Numbers and Share of Urban Employees/Retirees who Did Not Receiving Full Wage/Pensions

Year	1994	1995	1997
Urban Employees (million persons)	184.13	190.93	202.07
Employees whose salary were partly or fully default by firms (million persons)	4.95	4.79	10.96
Share of total employees (%)	**2.7**	**2.5**	**5.4**
Retirees (million persons)	20.79	22.41	25.33
Number of retirees whose pensions were partly or fully default by firms (million persons)	1.15	0.7	N/a
Share of total retirees (%)	**5.5**	**3.1**	**N/a**

Note: figures of employees and retirees who did not receive full payment for 1994 and 1995 are for 23 provinces; figure for 1997 is for the 31 provinces of the whole country.
Source: author's calculation based on Zheng (2000); SSB (1999).

Table 5-6. Comparison of the Provincial Minimum Wages and the UMLS Lines in Capital Cities in 1999

Province	minimum wages[a] (yuan/month)	UMLS (yuan/month)	UMLS/Minimum wages (%)
Beijing	400	260	65
Tianjin	350	241	69
Hebei	290	182	63
Shanxi	300	156	52
Neimonggu	273	143	52
Liaoning	240	195	81
Jilin	270	169	63
Heilongjiang	250	182	73
Shanghai	423	280	66
Jiangsu	320	195	61
Zhejiang	380	215	57
Anhui	240	195	81
Fujian	380	221	58
Jiangxi	290	130	45
Shandong	320	208	65
Henan	290	169	58
Hubei	280	195	70
Hunan	280	169	60
Guangdong	547	312	57
Guangxi	200	195	98
Hainan	350	221	63
Chongqing	270	169	63
Sichuang	270	156	58
Guizhou	260	156	60
Yunnan	300	182	61
Shaanxi	260	156	60
Gansu	289	156	54
Qinhai	260	156	60
Ningxia	300	130	43
Xinjiang	390	156	40

Note: a. most provinces had several different minimum wage standards, which applied to different cities or counties with one province that had various standards of living. The higher level of the standard is listed since the capital city often has the highest living costs within a province.
Source: author's construction based on Labour Security News Report (2000: 21)

Table 5-7. Some Aggregate Figures for the UMLS Program (1998-2002)

Year	1998	1999	2000	2001	First 6 months of 2002
Recipients (million persons)	1.84	2.66	4.03	11.71	19.15
Share of urban Population (%)	0.49	0.68	0.88	2.44	-
Relief costs (billion yuan)	0.7	2.37	3.45	5.00	3.66

Source: number of recipients and relief costs figures are from the MCA (various years); Urban population figures are from SSB (various years).

Appendix 5.1: A Simple Empirical Study of the UMLS Program

A.5.1.1 The Motivation for the Exercise

In this Appendix, a simple empirical test is conducted, as the first attempt so far, to examine the relationship between the city UMLS line and other local economic indicators, especially the government budgetary status and the local cost of living. The purpose is to see whether these two factors had any significant impact on the actual level of the poverty line of UMLS the first few years of the UMLS program.

This exercise uses a simple demand-supply model of poverty relief provided by the UMLS program. The supply side depends on the situation of the city government's budgetary revenues, since the UMLS program has been mainly financed by the city government. The demand for relief is determined by several factors: (1) the local UMLS standard, (2) the size of poor households, and (3) calculated household incomes per capita. The local government can manipulate the demand for relief by adjusting the UMLS level as well as how household incomes are calculated. However, reducing the UMLS line excludes households with relatively high incomes among the poorest group, which may reduce the program's effectiveness in poverty relief.

This Appendix is composed of the following sections: section A5.1.2 establishes the supply-demand model for the UMLS poverty relief. It is followed by some discussions of the data used. The results are presented in section A5.1.3. Some comments with regard to these results are in the final section of conclusion.

A5.1.2 The Model

The main supply side variable is the local government's budgetary revenue. The government decides what percentage of its budgetary revenue is to be used for the UMLS program. This relationship is expressed by the following simple supply function:

$$S = \alpha R \qquad \text{(A5.1-1)}$$

where S is the supply for UMLS relief (in 100 million yuan/year), R is the annual budgetary revenues of the local government (in 100 million yuan/year), and α is the proportion of the revenue that the government wants to use for the UMLS program.

The demand side is determined by local living costs as well as poverty incidence in the area. Ideally, it should include variables such as the local consumer price index, which allows for cross-city comparison of living costs. It should also include the local gross domestic product (GDP) per capita, and the Gini coefficient as a measure of income distribution. However, in practice, some of these variables are not available at the city level. As a result, other variables are used in this empirical study. The demand side is approximated by the following equation:

$$D = F(MLS, W, UR, POP, GDP) \qquad \text{(A5.1-2)}$$

where D is the city's demand for UMLS relief (in 100 million yuan/year), which is a function of the city's UMLS line (in yuan/month per person); the local living costs, approximated by the local average wages, W (in 1000 yuan/year per worker); a variable that affects the local poverty incidence, the city's unemployment rate, UR (in %/year); and a variable that is positively related to the number of people who need relief from the UMLS program, the city's population of the year, POP (in 100 million persons); and finally, the scale of the local economy, represented by the annual GDP of the city (in 100 million yuan).

The city government chooses the level of the UMLS line, such that the demand for UMLS relief can be met by the proportion of the budgetary revenue that the government intends to spend on the program. Therefore, the local UMLS line to be chosen is expected to be a function of R, W, UR, POP and GDP. These variables and their definitions are listed in Table A5.1-1.

A5.1.3 The Data

Most studies of the UMLS program are based on either national or provincial figures. The data that will be used for this estimation are at the city level. They come from two major sources:

(1) The UMLS lines adopted by cities are from various independent studies of the UMLS program, and some working reports by the staff members at the MCA (Shi 1999; Zhou 1999; Zheng, Wang et al. 2000). Thus, these cities are not randomly selected samples for statistical studies, but are chosen here simply because the information for their local UMLS lines is available. Therefore, some provinces may be over-represented, such as Anhui, Guangdong, Liaoning, Hebei, and Henan. However, since the purpose of this exercise is to look at the situation of the UMLS program at the city level, this should not be a major concern. The data cover 96 cities[43] over three years. Most of the sample cities are medium to large cities in China, which represented approximately 43 per cent of the total 221 medium to large cities during this period. They are not panel data, although some cities appear in the sample more than once, for instance, Hefei and Beijing. 49 observations are from 1996, 26 from 1997, and 20 from 1998.

(2) Other relevant figures for these sample cities are from various issues of the *Urban Statistical Yearbook of China* (SSB 1997, 1998, 1999) These include the size of the economy, the municipal annual GDP (GDP); city government annual budgetary revenues (R); the local official unemployment rate of the year (UR); the average annual wages of the city (W) and the city population (POP). All figures for 1997 and 1998 are at 1996 constant values. This is calculated using urban consumer price index for each province, since the relevant index is not available at the city level.

A5.1.4 The Results

Based on the demand and supply functions discussed previously and expressed in equations (A5.1-1) and (A5.1-2), equilibrium occurs when the supply of relief equals demand for relief:

$$S(R) = F(MLS, W, UR, POP, GDP) \qquad \text{(A5.1-3)}$$

[43] There were 666 cities in China by the end of 1998.

In this supply-demand model for poverty reduction, the UMLS line can be regarded as the price, and that the expenditure on UMLS can be regarded as the quantity. However, in this particular situation, the higher the UMLS line, the more people will be qualified for the relief, and therefore, the higher the expenditure of the program. Assuming that the government has full information, it can choose the appropriate level of the UMLS line such that the expenditure demanded is equal to the budgetary revenue that the government intends to spend on the program. This gives the reduced form of the equilibrium condition for the local UMLS line:

$$MLS = a * UR + b * POP + c * (GDP / POP) + d * (R / POP) + e * W \qquad \text{(A5.1-4)}$$

where variables are defined in Table A5.1-1.

Table A5.1-2 lists some summary statistics for these figures. The samples are very diversified, including cities of very different urban population sizes, as well as the size of the economy (GDP of the city). They also include 'rich' and 'poor' local government in terms of budgetary revenue per capita. The diversification of these cities' economic situation leads to quite different levels of the city UMLS line. For instance, the minimum of the UMLS standard was about 70 yuan/month (1996 value) per person, while the maximum was 230 yuan/month per person (1996 value), with the mean of 120 yuan/month per person for the sample.

Equation (A5.1-4) is estimated using the simple OLS approach, in four different combinations of the explanatory variables. The results are shown in Table A5.1-4[44]. Among the independent variables, the local unemployment rate (UR) and the local average annual wages (W) are significant in all four cases. When the unemployment rate is one percent higher, all other things being equal, the UMLS is reduced by about 2 yuan/month per person. This is because when the unemployment rate is higher, more local people are likely to fall into poverty, forcing the government to reduce the level of the UMLS line, so that the available fund can meet the demand. When the average annual wage (W) is 1000 yuan/year higher, the UMLS level is increased by about 10 yuan/month per person. This is because when the average wage is higher, the local

[44] Table A5.1-3 shows correlations between the variables used in the regressions.

living costs are likely to be higher, pushing up the local minimum living security line. These two variables at the demand side show significant impacts on the local UMLS level. The city's population (POP) and the local GDP per capita (GDP/POP) have no significant impact on the UMLS level.

The supply side variable: the local government budgetary revenue per capita (R/POP), shows mixed results in the four cases. It has a positive but insignificant impact in cases 1 and 3, where the GDP per capita variable (GDP/POP) is also included in both cases. This result is likely due to the high correlation between GDP per capita and budgetary revenue par capita, as shown in Table 5.1-3. When GDP per capita is not included in the regression, as in cases 2 and 4, local government revenue per capita does have a positive and significant impact on the UMLS level. However, the magnitude is very small: when government revenue per capita increases by 1000 yuan/year, the UMLS line increases by less than 1 cent.

The significant yet small role of the local government budgetary revenue in deciding the local UMLS line is, perhaps, due to the following reasons:

? Only a very small proportion of the local budgetary revenues were spent for the UMLS program. As a result, the budgetary revenues have little impact on the UMLS line. Table A5.1-5 shows some figures for Hefei City, Anhui province during the first three years of its operation of the UMLS program. The local UMLS standard rose from 120 yuan/month, per person in 1996 to 130 yuan/month (127 yuan in 1996 value) per person in 1998. The share of UMLS expenses in budgetary revenues was less than 1 per cent spent each year. This was the common situation nationwide during this period (Wang 1999a).

? The local government budgetary revenue was not the only source of funds for the UMLS program. As mentioned previously, during the sample period, many city governments shared costs with lower level governments, or required SOEs to pay for UMLS relief for their employees and retirees. In addition, poor cities could expect budgetary transfers from the provincial government and the latter from the central government if they had difficulties in meeting the demand for local poverty relief. If the local government could expect some assistance from the higher-level government, then the 'budget constraint' of the local UMLS lines would not be very tight.

Table A5.1-1. Definition of Variables in the Regression

Variable	Definition	Unit
UMLS	The Urban Minimum Living Security line of the city	yuan/month per person
UR	Official unemployment rate of the city	%
POP	Population of the city	100 million persons
GDP	Annual gross domestic product of the city	100 million yuan
R	Annual government revenues of the city	100 million yuan
GDP/POP	Annual GDP per capita of the city	yuan/per person per year
R/POP	Per capita annual government revenue of the city	yuan/per person per year
W	Average annual wage of the city's urban employees	1000 yuan/year per capita

Table A5.1-2. Summary Statistics for the 96 Sample cities (sample size: 96)

Variable	Mean	Standard Deviation	Minimum	Maximum
UMLS (yuan/month*per capita)	119.8	28.4	67.3	230
Unemployment rate (%)	2.4	2.6	0.1	17.9
Urban Population (100 million persons)	0.9	1.3	0.1	8.7
GDP per capita (1000 yuan/year)	20.1	10.1	0.6	6.8
Budgetary revenue per capita (1000 yuan/year)	1.2	0.6	0.4	3.7
Average wage (1000 yuan/year)	6.5	1.7	4.0	11.4

Source: author's calculation based on selected samples.

Table A5.1-3. Correlation Matrix of the Variables (sample size: 96)

	UMLS	UR	GDP/POP	R/POP	W	POP
UMLS	1.0					
UR	-0.3	1.0				
GDP/POP	0.5	-0.2	1.0			
R/POP	0.6	-0.1	0.7	1.0		
W	0.7	-0.2	0.6	0.7	1.0	
POP	0.4	-0.1	0.1	0.3	0.5	1.0

Source: based on the data set collected by the author.

Table A5.1-4. Regression Results of the UMLS Levels in Selected Cities in China: (Dependent variable: UMLS; Number of observations: 96)

	(1)	(2)	(3)	(4)
Adjusted-R squared	0.51	0.54	0.54	0.52
F statistics	20.9	26.4	26.2	35.3
UR	-1.8 (0.8)**	-1.8 (0.8)**	-1.9 (0.8)**	-1.8 (0.8)**
R/POP	0.008 (0.006)	0.008 (0.005)*	0.009 (0.005)	0.008 (0.005)*
W	9.3 (2.0)***	9.3 (1.8)***	9.9 (1.7)***	9.8 (1.6)***
POP	0.01 (0.02)	0.01 (0.02)	-	-
GDP/POP	4.0e-07 (0.0003)	-	-0.00008 (0.0003)	-
Constant	52.7 (9.5)***	52.7 (9.2)***	50.9 (8.9)***	51.1 (8.9)***

Note: 1. Figures in brackets are standard errors.

2.'-' Indicates the variable is not used in the regression;

3. * indicates the coefficient is significant at 10%, ** indicates the coefficient is significant at 5%, **** indicates the coefficient is significant at 1%.

Source: author's regressions.

Table A5.1-5. Expenditures of UMLS Program versus Local Government Budgetary Revenues in Hefei City, during the First Three Years of the UMLS Program

Year	UMLS (yuan/month per person)	Expenditures of the UMLS program (million yuan) (1)	Local government budgetary revenues (100 million yuan) (2)	(1)/(2) (%)
1996	120	0.21	9.14	0.02
1997	120	2.97	12.49	0.24
1998	130	2.26	16.12	0.14

Source: expenditures of the UMLS program are from author's interview with the local branch of the MCA; budgetary revenues are from SSB (various years).

Appendix 5.2: The Floating Population in Chinese Cities

In this appendix, the background and the situation of the floating population in Chinese cities is briefly discussed.

A5.2.1 The Floating Population in Chinese Cities

Since the economic reform, especially since the mid-1980s, policies[45] that curbed labour mobility during the pre-reform era have become less effective (Zhao 2003). In the meantime, surplus rural labour force has been 'pulled'[46] and 'pushed'[47] towards cities (Zhao 2003, Wang 2001; Hare 1999), and migration among cities has also become more common.

Migrants often come to large cities and economically booming coastal cities in east China to find jobs, despite the institutional barriers that are still in place, such as the HRS. These migrants in cities can be divided into two categories. The first category includes those who have obtained the city's household registrations and become permanent residents of the city. They often are treated as other local residents and have equal access to employment opportunities as well as other public welfare benefits, such as pensions, medical care. However, obtaining a city household registration has been very difficult and it has rarely happened (see Chapter 3 and Zhao 2003). With the government's policies, the majority of rural workers in cities belong to the second category. They are not able to obtain city household registrations and are therefore temporary residents, regardless how long they have stayed in the city. In the literature and in government regulations, this group of migrants are referred to as the 'floating population', 'people from another place', 'temporary population' and some times 'peasant workers'[48], often with slightly different definitions (Li 2001: 17). The second category of migrants, especially those from villages, is the group of migrants that is interest here, since they have been discriminated against with regard to the social and economic

[45] These policies are discussed in Chapter 3.
[46] For example, income and living standard gap between cities and villages are among the factors that pulled farmers towards cities.
[47] For example, improved agricultural production efficiency and surplus labour are among factors that pushed farmers to go to cities for jobs.
[48] This is because the majority of them are from villages.

entitlements in cities they live. This category of migrant workers is referred to as the 'floating population' in this appendix and this chapter. It is broadly defined as rural workers who hold agricultural household registrations but come to cities to look for jobs, and do not have the household registration of the city of destination.

A5.2.2 Government Policies Towards the Floating Population and the Scale of the Floating Population

In 1984, in response to surplus rural workers[49], the government began to encourage rural people to engage in non-farm activities, such as rural industries in the form of township and village enterprises (TVEs), domestic trade and long-distance transportations. Also in 1984, government policies began to allow rural people to move their household registration to small towns, but they were not eligible for rationed food grain (see Chapter 3 for a brief discussion for rationing in China) (Zhao 2003). At this stage, the policy was to encourage farmers to 'leaving the land but not to leave the villages'. However, small towns did not attract many rural workers due to their lack of employment opportunities. Many rural migrants moved to cities, including big cities such as Beijing and Shanghai as well as booming cities in the coastal areas (Li 2001). The Ministry of Public Security then issued 'The Temporary Regulations with regard to Temporary Residents in Urban Areas' in 1985. It emphasizes that any temporary resident who stays for more than 3 days in the city to register at the local police station. Those who stay more than 3 months and are 16 years or older must apply for 'the temporary resident certificate' (Li 2001). In 1995, the Ministry of Labour (MOL, now the Ministry of Labour and Social Security, MOLSS) required every rural migrant to obtain 3 certificates and one card to be considered a legal temporary resident in cities (Zhao 2003):

- Identification certificate: this is issued by the police station of the originating county. It is a personal identification card that is issued to all Chinese citizens.
- Temporary resident certificate: this is issued by police stations in destination cities and needs to be renewed every year for migrants to legally live in a city that is not their household registration location.

[49] Studies contribute the surplus farmers to the improvement of efficiency after the agricultural reforms since 1978, and the very low land/people ratio in rural China (Zhao 2003; Hare 1999).

- ❖ Employment certificate: this is issued by labour bureau of originating counties to migrants as a certificate for the eligibility for employment.
- ❖ Employment card: this is issued by labour bureaus of destination cities, as a proof of employment in cities of destination. It is only issued with the presence of the three certificates mentioned previously.

In addition to these national regulations, many provinces, most capital cities and cities in the east coastal arrears have their own local regulations that target the floating population (Li 2001). These policies often impose restrictions on the floating population in house renting, employment and family planning, etc. Obtaining household registration in cities, especially large cities, is still very difficult for most of the floating population[50].

Despite these government policies at national, provincial and municipal levels to restrict migration, the number of floating population has been increasing and is referred to as 'the history's largest labour flow' (Wang and Zuo 1999: 276). However, it is a difficult question to have an accurate answer of how large the scale of the floating population in Chinese cities. Official statistics often report city population based on the household registration, and therefore exclude the floating population. Recent population censuses (such as those in 1990 and 2000) and surveys started to cover people more based on actual residency instead of solely on household registration[51]. Since the household registration based population statistics are reported at different time of the year (usually at year end) as that of population census or surveys, the floating population cannot be calculated by simply deducting the household registration population from the census results. However, the difference between the census figure and the household registration statistics provides a rough estimation of the scale of the 'floating population'[52]. According to the Almanac of China's Population (CASS 2001), at the end of 2000, the population of Beijing City (including all residents who had lived in Beijing for 6 months or more) was 13.64 million, while the household registration population

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[50] Few areas have relaxed the restriction of the HRS. Guangdong Province has been advanced in this regard. For example, the province issued new policies in 1995 and 1999 to protect some rights of the floating population. In particular, it allows migrants who have been temporary residents for 7 year to obtain urban household registration (Li 2003).

[51] These recent censuses include both residents with local household registration and those who live in the city for more than 6 months (CASS 2001).

[52] The difference between the census and the household registration figures also include floating population from other cities in China. But majority of them are from rural areas.

was 11.08 million. These figures indicate that in Beijing, the floating population was about 2.6 million, or nearly 20% of its population. In Shanghai City, the figures for 2000 were 16.74[53] million and 13.22 million, respectively. So the floating population was about 3.5 million, or slightly above 20% of its population.

As Wang (2001) notices, estimations of the scale of the floating population vary significantly, often due to definitions of this category and purposes of studies and surveys. However, various studies point to a single fact: that a large scale and increasing number of farmers are moving into China's cities for employment. Jiao (2002: 74) notes that the scale of floating population was no more than 30 million people in the early 1980s, while sources indicate that by 1995, it reached 80 million, with Shanghai City had 4.65 million and Beijing City had 3 million floating population. Rawski and Mead (1998) use information from cost surveys in rural China to estimate China's farm labour force during 1979-93. The result suggests that there were more than 100 million rural people who actually worked outside the agricultural sector. Rozelle and de Brauw (et al. 2002) conduct a rural household survey in 2001. Their study further confirms that migration has become the most important form of off-farm employment, with young workers dominating the rising trend of migration. Wang (2001) examined a few studies including both official figures and surveys conducted by government departments and institutes. She concludes that by the mid-1990s, the number of floating population in cities was about 80 millions. A recent statistics from the Ministry of Agriculture shows that there are 92 million rural workers have left their household registration place for more than 6 months and have moved to cities to work (Jiang 2003). Based on these sources, it is reasonable to have some rough estimations of the scale of the floating population in urban China: during the early 1980s, the floating population accounted for less than 12%[54] of urban population. By the mid-1990s, they accounted for about 23%[55]. In recent years, both the population with urban household registration and the floating population have been growing[56]. Roughly speaking, there is one migrant among every 4-5 urban residents in Chinese cities.

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[53] This figure is for the end of October 2000.
[54] This is calculated by assuming the floating population was 30 million, and those with urban household registration was, on average, 226.1 million over 1981-1985 (SSB, 2000a)
[55] This is calculated by assuming the floating population was 80 million in 1995.

A5.2.3 The Situation of the Floating Population

Studies find that vast majority of the floating population are young people. Wang (2001) summarises studies of the floating population during the mid-1990s and find that the average age of rural migrants was much lower than the average age of the rural labour force. Most of the rural migrants were between 20-35 years old. Rozelle and de Brauw (et al. 2002) find that there is strong evidence in their rural household survey, conducted in various years, that the increasing trend of rural migrans is dominated by young and better-educated workers.

The situation of the floating population in China is not good. In general, since the floating population does not have the urban household registration, it is discriminated in cities in all aspects of their life, such as legal rights, as well as economic and social entitlements (Jiao 2002; Meng 2000; Zhao 2003). For example, children of floating population have to pay very high fees to go to local schools, despite that free junior secondary education is provided in China's cities (Meng 2000; Zhao 2003). Rural workers in cities earn much lower wages compared with their urban counterparts; they work under very tough and sometimes dangerous conditions; they are often blamed as the sources of social and economic problems in cities (Hennock 2001). In addition, local governments often adopt regulations to impose institutional barriers to reduce the floating population, such as restrictions and punishment of urban firms that hire rural workers. These regulations increase the costs of migration (Li 2001; Wang 2001). As a result of these policies, floating population is pretty much segregated from those urban residents who have local household registration. These rural migrants have formed a second class in China's cities and among the most vulnerable people in urban China.

Recently, there have been some changes in government policies with regard to the household registration system and the rural floating population (Hennock 2001; Taylor 2003). In particular, the State Council issued a notice on the 5th of March 2003 (State Council 2003) urging city governments to improve the management of and to provide better services to the floating population in cities. In this notice, the government acknowledges the positive impacts of rural to urban migration. It urges local

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[56] An important source of the growth of number of households with urban household registration is when the county is upgraded to a town for administrative purpose.

governments to eliminate unnecessary restrictions on the floating population, to solve the problem of wage arrears to rural workers, and to ensure children of rural migrants have the same access to education as local students.

However, the floating population is not only discriminated against in employment and other legal rights as labour, but is also excluded from all the social welfare benefits that are only distributed among urban residents with household registration (Meng 2000; Jiao 2002). As employees, except those who work in the public sector, they often have no access to pensions, medical insurance, and unemployment benefits, etc. As residents of cities, they are not entitled to the safety net provided by municipal government—the UMLS program.

Chapter 6. Economic Transition, Population Aging and the Study of the Old Age Pension Reform in China: Smoothing the fiscal burden over time

6.1 Introduction

As the discussions in the previous two chapters have shown, reform of the social security system in urban China was driven by the overall economic reform. In the case of the old age pension program, it was also driven by financial pressure from the old, work unit-based, PAYGO system. Among the major social security programs, pension reform started first, and has undergone the most dramatic changes. During the 1980s and 1990s, this system was changed from a PAYGO system towards a partially funded, three-pillar system. In addition, the pension program is by far the largest social security program in urban China. For instance, in 1999, the total expenditure for pension payments accounted for more than 75 per cent of total expenditure for major social security programs in urban China, while the second largest expenditure was for medical care, which spent about 20 per cent of the expenditure of the five main programs (see Figure 6-1). Due to its significance, pension reform is chosen to be the case study for future reform options of the Chinese social security system. It is expected that this case study will help to gain some insight for reforms of other social security programs in China.

The problems facing China with pension reform are similar to those in many other countries in the world (World Bank 1997). For instance, many world economies, including China, are experiencing population aging (World Bank 1997; Peterson 1999). However, the Chinese pension reform is more complicated, because it occurred against the background of a dramatic transition from a centrally planned to a market-oriented economy. Among many interesting issues with social security reform in China, and the pension program in particular, the economic efficiency of financing the programs is very important. This is especially so because the economy is undergoing various reforms to explore the benefits of a more market oriented system. The study of the pension scheme is divided into two chapters. Both this and the next chapter look at reform options for China's pension reform, taking into account of population aging and economic transition.

Many studies of Chinese pension reforms focus on the financial viability of the program, in the short and medium run[1]. However, there are several financially viable pension options and the choice between them will have significant economic efficiency impacts on the economy: (1) for the economy as a whole over time and, (2) via taxation effects on individual employees. These efficiency impacts are examined in the two chapters, respectively. This chapter focuses on the optimal taxation approach to finance a defined-benefit pension scheme over time versus a PAYGO year-by-year financing scheme. Chapter 7 looks at the taxation impact of a funded scheme on employees, with special reference to the current Chinese pension scheme.

The choice of a pension scheme needs to consider the following features of the scheme:

(1) How the program is financed, that is, whether it is a PAYGO system or a funded one. In the former case, pensions are paid from revenues collected from current workers; while in the latter, they are paid from accumulated contributions from previous years.

(2) Whether the program is defined-benefits program or a defined-contribution one. The former approach pays pensions that are pre-determined, and taxes/contributions vary accordingly. The latter is opposite. It collects pre-determined taxes/contributions, but allows benefits to change accordingly. Although there is no theoretical necessity, in practice, a PAYGO system usually pays a defined-benefit pension to retirees, while a FF system usually specifies the contribution rate (usually based on wages).

Related to these two features are two issues that need to be distinguished. From the government's viewpoint, the difference between a PAYGO and a funded pension scheme is simply a matter of the government budgetary practice. In a PAYGO public pension scheme, future public pension liabilities are not recorded explicitly as government liabilities at the time revenues are collected from current workers. However, in a funded public scheme, the government's future pension liabilities are recorded when funds are collected to accumulate for the future. This distinction

[1] Examples include: Boadway (1991), He (2000), Li (1998), Li (2000), Arron (1999), World Bank (1997), West (1999), White and Shang (1995), White and Shang (1996).

between a PAYGO and a funded public pension scheme is important for the government. When the government examines its budgetary status for the foreseeable future, it must consider all its liabilities, including future pension liabilities. In particular, the government that adopts a PAYGO public pension scheme must examine whether its budget still balanced, or at least not so far out of balance that the credibility of future pension entitlements is doubtful, when all its pension liabilities are explicitly recognized.

A separate question is whether pension contributions are pooled together as 'collective' funds or kept in 'individual accounts'. In practice, the former is usually associated with a PAYGO scheme; while the latter is linked to a FF system, such as in the current Chinese pension scheme, although in theory, a PAYGO pension scheme can have individual accounts, and funds in a FF system can be pooled together. For example, the former would occur when: (1) the government pays all its expenditures, including pensions, from current revenues (including pension contributions), and (2) the government pays pensions to retirees according to a stipulated formula that links pensions to retirees' previous contributions. An example of the latter could be when all retirees get a uniform pension, but the benefits are paid from pooled funds accumulated from previous contributions. When a public pension scheme is mandatory, its effects on incentives depend upon how closely contributions are linked to future pension benefits, rather than on whether it is a PAYGO or a funded scheme. However, this latter distinction? between PAYGO and funded? is very important if the age structure of the population is changing rapidly because under a PAYGO system the government budgeting process fails to take proper account of government liabilities.

The choice of the pension scheme also needs to consider factors that are not directly under government control, for instance, demographic changes of the economy over time. Specifically, system age structure[2] has an impact both on revenue and outlay of a PAYGO, defined benefit program[3]. The larger the working age population, the larger is the program contribution base, *ceteris paribus*. On the other hand, if the ratio of the number of retirees to the number of workers is high, the financial burden of the program is higher, *ceteris paribus*.

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[2] System age structure refers to the age structure of the population covered by a public pension program.
[3] This has been studied by many researcher, for example, see Feldstein, (1996), James (1999).

Another factor that needs to be considered in pension reform is the 'transition costs/pension debt' of pension reforms. In a PAYGO system, an implicit public debt is generated from the first generation of retirees: they receive public pensions contributed by current workers without making any contribution during their working life. This implicit public debt of pensions is not necessarily a problem if the system carries on to the future, when each working generation pays for retirees[4]. However, it becomes a problem if the government wishes to change from a PAYGO system to a funded system. During such a transition, the working generation has to contribute to their own retirement, if they are enrolled in the new funded system. In the meantime, since current retirees have contributed during their working years, the government has to finance their pension liabilities promised by the old PAYGO system. These public pension liabilities are the so-called 'transition costs' to be financed by the government if such a reform is carried out. These public pension liabilities are not really 'costs' of the pension reforms. Instead, the issue is merely an accounting problem since the pensions of the last generation that belongs to the PAYGO system must be paid whether the system is reformed or not. The problem is the need to correct the accounting error that is implicit in a PAYGO system, which fails to take proper account of the government future liability for the pensions of those who have contributed to the system. The recognition of such liabilities has an adverse effect on the government's measured budgetary position. How the government finances these liabilities can have efficiency impact on the current and future generations.

This chapter examines two policy options in the context of population aging and economic transition in China. The first one is a defined-benefit, PAYGO scheme financed on a year-by-year basis, which is similar to the old public pension scheme in China described in Chapter 3. The second one also has defined-benefits, but it adopts optimal tax rates over time in order to minimise the efficiency costs of the scheme. A theoretical model based on Barro (1979) is used, which is modified to incorporate the transition features of the Chinese economy.

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[4] It can become a problem, though, when the population is aging. This aspect is discussed in the next part of this chapter.

The next chapter focuses on the economic impact of the current, post-reform public pension scheme in China. It also examines the economic burden of financing the transition costs if the Chinese government wants to transform the scheme to a fully funded pension program.

The chapter is organized as follows. The next part discusses estimations of population aging in China during the past 20 years, as well as projections for the next 50 years. Part three looks at the implications of population aging on financing alternative public pension systems. Part four establishes an analytical model based on Barro's (1979) framework. The model uses explicit measurement of the deadweight loss, and has the same results. Part five conducts some simulations using the results of the model to show the difference of dead weight loss associated with alternative approaches to finance the old defined-benefit public pension schemes in China over a 50-year period. The last part concludes the chapter.

6.2 Population Aging in China: What Happened during the Past Twenty Years and What will Happen during the Next Few Decades

Due to lower fertility rates and longer life expectancy, population aging is being experienced in many countries in the world (Treas and Logue 1986; IMF 1996). Since population aging is accompanied by a rising retiree/worker ratio covered by a public pension system, it raises concerns about financial viability for the system (Hussain and Zhu 1996; Schieber and Shoven 1996). Some countries, such as Chile and Sweden, have converted their former PAYGO, defined benefit pension system into funded ones (Schieber and Shoven 1996; Peterson 1999).

The Chinese population is also aging, but this process has three distinct features:

- ? Unlike most of the other countries, where the population aging process occurs as a result of families choosing to have fewer children, population aging in China has largely been the result of the one-child policy adopted by the government in the late 1970s (Wu 1991).
- ? While most other economies with an aging population belong to developed countries, China 's aging population has begun when its per capita GDP is much lower (Peterson 1999);

? The population aging process in China may be more unbalanced across regions than in most other countries. Due to various policies implemented during the pre-reform period[5], rural and urban areas in China have been more or less separated. Since the one-child policy has been more effective in cities than in villages, population aging is more prominent in urban than in rural areas (Hussain and Zhu 1996). However, rural-urban migration, especially from villages to cities, has been increasing since the economic reforms, particularly since the early 1990s (See Section 5.5.2; Zhu 1999; Zhu, Gu et al. 2001). Since these migrants tend to be young people, and the scale of migration is large[6], they are expected to reduce the speed of population aging in cities, and to accelerate it in villages. This type of rural-urban migration will affect the public pension system in the near future, since the current old age pension program only covers urban employees[7].

There are several measures of population aging:

- The median age of the population provides a rough idea about how 'old' the population is;
- The share of people aged 60[8] or over in the population gives a measure of the proportion of population that are old and need support;
- The old-age dependency ratio is a very useful measure for examining the financing of an old age pension program. In this chapter, unless otherwise stated, this ratio is defined as the number of people aged 60 or over to the number of people of working age, which is defined as aged between 15 and 59. The higher the old-age dependency ratio, the higher the burden on current workers to support retirees. In a PAYGO, defined benefit pension system, this ratio largely determines the system dependency ratio and thus affects the tax rate required to finance the system.

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[5] These policies include some that are still in place, for example, the household registration system, as well as those that have been abolished, for example, food rationing and restrictions on domestic travelling. For more details of these policies and their effects, see Chapter 3.

[6] For example, see Hussain and Zhou (1996), Hu (1984), and Nolan (1993).

[7] The impact of rural migrants on urban age-structure, of course, depends on future government policies on HRS and the coverage of the old age pension scheme.

[8] The age of 60 is chosen since this is in line with the current official retirement age in China, although the retirement age is different for female workers and professionals. See Chapter 3 for details.

This section first examines population aging in China during the past twenty years of economic reform, and summarises some projection results for the next 50 years. It is followed by a brief discussion on the possible impact on the population aging process of a different demographic policy—a 'two-child' policy. The regional, especially rural and urban, differences of age structures, and the implication of migration on urban population aging are briefly discussed at the end of this section.

6.2.1 Population Aging in China

Birth control and especially the one-child policy, which commenced in the late 1970s, has contributed to dropping fertility rates in China. Between 1970 and 1980, the total fertility rate (TFR) in China dropped from about six births per woman to 2.3 births per woman (Wu 1991). The TFR indicates the average number of children a women would bear over the course of her lifetime if current age-specific fertility rates remained constant throughout her childbearing years (usually between 15 and 59). Therefore, these figures show that an average Chinese woman in 1970 was expected to have 6 children during her lifetime, but by 1980, this number had dropped to about 2.3 children. This is an extraordinarily large change compared with any other nation over a comparable span of time (Bongaarts and Greenhalgh 1985). In the meantime, life expectancy of the Chinese population increased steadily from about 40 years in the early 1950s to nearly 70 years in the late 1980s (Wu 1991).

Some demographic statistics for the whole Chinese population during the past 50 years or so are shown in Table 6-1. From the 1950s to the early 1980s, there is no indication of an 'aging population'. The median age in 1982 was similar to that thirty years earlier in 1953. The proportion of people aged 60 and over in the population was only slightly higher in 1982 compared with that in 1953, while the old-age dependency ratio was the same in 1982 as in 1953. In fact, the (total) dependency ratio? the share of the young (aged 14 and less) plus the elderly (aged 60 and over) in population? increased but then declined during this period. In 1982, total dependency ratio was 10 percentage points lower than that in 1953. In fact, comparing figures of the 1964 census and those of the 1953 census, it is clear that the population was very 'young'—median age, the share of population aged 60 and the old-age dependency ratio dropped.

As for the period between 1984 and 2000, the two decades following the introduction of the one-child policy, the figures indicate only minor population aging. The median age rose by 2.3 years between 1982 and 1990, the share of people aged 60 and over rose by 1-percentage points and the old-age dependency ratio was 0.5 percentage points higher during this period. However, due to the falling fertility rate followed the one-child policy, the total dependency ratio dropped by 12.5 percentage points.

Given the low fertility rates after the introduction of the one-child policy, it is expected that China will experience rapid population aging during the first few decades of the 21st century. Although there are slight differences among the detailed results, several demographic studies point to the same direction of a rapidly aging population. Some results of these studies are summarized here in tables and figures. Table 6-2 lists findings from population projections conducted by the World Bank (Bos, Vu, et al. 1994), the United Nations (1999) and a joint project by Japanese and Chinese scholars (Wu 1991)[9]. According to the United Nation's projection, the median age of the Chinese population will increase from 27.6 years in 1995 to about 40 years by 2025, and it will rise to 44 years by 2050. The share of people aged 60 and over in population will increase from less than 10 percent in 1995 to more than 19 per cent in 2025. This share is projected to reach 29.9 per cent in 2050 by the UN, while it is 21.4 per cent according to the joint project by Japanese and Chinese researchers, and about 26.5 per cent projected by the World Bank.

Two dependency ratios are listed in Table 6-2: the total dependency ratio and the old-age dependency ratio. The total dependency ratio is defined the same way as in Table 6-1. It measures the average number of dependents each working-age person has to support. The results of the projections by the World Bank (1994) and the UN (1999) show the similar trend that the ratio first declines from 1995 to 2010 and then rises after 2015. In 1995, on average, every two working-age people had to support one dependent. After that the burden drops slightly until 2010. It then picks up and rises rapidly. By 2050, on average, every five working-age persons will have to support about four dependents, according to the projections by the UN and the World Bank. The projection adopted in Wu (1991) predicts a similar trend, but the burden of

[9] The results of the study are cited by Wu (1991).

dependents is projected to be lower by 2050, compared with the results of the UN and the World Bank[10].

The old-age dependency ratio is an indicator showing the economic burden of the elderly on the current workforce. Again, the projections of the World Bank and the United Nations show similar rising trend, but the UN's result indicates am even higher burden of the elderly on the labour force by 2050. In 2000, both projections show that this ratio was about 16 per cent. This means that every 6 workers supported one old person. By 2025, it is projected that, on average, roughly every 3 workers will have to support one old person (both the World Bank and the UN); and by 2050, every 2 workers will have to support one old person according to the UN, while the World Bank's projection is every 2.1 working-age people per old person. The projection adopted in Wu has very similar results as the UN.

Figure 6-2 shows the population age structure in China projected by the UN (1999) for selected years during the first 50 years of the 21st century. In each panel, the horizontal axis indicates the number of people, while the vertical axis lists age group. The six panels listed show rapid population aging in China during the 50-year period. The age structure shifts from the usual pyramid shape in 2000 to one that is close to a rectangular shape, indicating both a rising number and share of old people in the society.

The population aging process in China is more striking, when it is compared with other regions. In Figure 6-3, the elderly dependency ratio of the population (the number of people aged 60 and over divided by the number of people aged between 15 and 59) is drawn for the world, China, the more developed regions and the less developed regions (excluding China), using population projection by UN (2001). Between 1950 and 2005, the ratio in China is similar to other countries of the less developed regions, but below that of the world population. According to the projection (UN 2001), after 2005, the elderly dependency ratio in China will rise rapidly to not only above the level of the rest of the less developed countries, but also above that of the world population. Moreover, the speed of population aging in China appears to be faster than that of the more

[10] The difference appears to due to the different assumptions about the key parameters. For example, the birth rate, death rate, total fertility rate, life expectancy, etc., and whether and how they vary over time.

developed regions between 2005 and 2050. By 2025, the old-age dependency ratio in China will reach 31%, which is the level of the more developed regions in 2000.

6.2.2 Population Aging and the One-Child Policy

The one-child policy has contributed to the projected rapid population aging in China by reducing the fertility rate since the early 1980s (Wu 1991; Hussain and Zhu 1996). Figure 6-4 draws the old age and the total dependency ratios in China from 1950 to 2050, based on results from the United Nation's population projection (UN, 2001). By definition, the distance between the two curves shows the young dependency ratio (number of people aged 14 and below/ number of people aged between 15 and 59).

While the old-age dependency ratio was quite stable during the period from the 1950s to the 1980s, the total dependency ratio rose from the early 1950s until the 1970s and then declined slightly during the 1970s. The total dependency ratio has dropped sharply since the late 1970s. These movements reflect changes in the young dependency ratio of the population, which is mainly determined by the fertility rate. This diagram shows that the falling fertility rate since the late 1970s has been able to maintain the trend of a falling total dependency ratio until 2000. However, it is projected that after 2010, when the fertility rate becomes stable, the rise of the old-age dependency ratio will dominate and the total dependency ratio will increase.

The fertility rate is one of the key parameters for population projection. The assumption made about China's future fertility rate is usually based on recent fertility rates obtained from population surveys in the past (Wu 1991). Projections by the World Bank and the United Nations are also based on fertility rates of the recent population surveys, even though they do include several scenarios of future paths of fertility rates. Recall that fertility rates in China since the 1970s have been affected by the government population control policy—the one-child policy. Thus the future fertility rate in China will not only depends on the past and current fertility rate, but also on the government's family planning policy. There have been some relaxations of the one-child policy in some areas in China during the first two years of the 21st century. One change is the so-called 'two-child' policies, which is said to have been implemented in twenty-five out of thirty

provinces in China[11] (Zhai 2001). The policy works as follows: if both husband and wife are the only child of their parents, the couple can have a second child if they wish. Since the generation born after the one-child policy is now entering child-rearing age, this policy may have a significant impact on the future fertility rate.

Even though the outcome of this change of the one-child policy is not yet clear, it is clear that its impact on population aging is different in the short-run and the long-run. If this policy turned out to increase the fertility rate in China, it can only slow down population aging in the long run. Initially, higher fertility rates increase the total dependency ratio before the children reach their working age. When they enter the labor force in 15-20 years, the outcome will be a lower old-age dependency ratio than would occur otherwise.

6.2.3 The Household Registration System, Rural-Urban Migration and Population Aging in Cities

Population aging in China has significant regional, especially rural-urban, variations. In Figures 6-5 and 6-6, the age structures in cities, towns and counties are drawn for men and women, respectively[12]. In Figure 6-5, the height of each bar represents the share of males in an age group in the total male population in cities, towns, and counties, respectively. The different age structure in cities and counties is obvious. The share of young people (aged under 15) is the lowest in cities, and the highest in counties. The order is reversed for the age group over 60, with the share of elderly males the highest in cities and lowest in counties. A similar pattern exists for females, as shown in Figure 6-6.

This pattern of different age structure across rural and urban areas is mainly due to government policies in China. One of the policies is the one-child policy. While the policy has been carried out in both cities and villages, it has been more effective in cities than in villages, since government control is more stringent in urban areas (Cooney and Li 1994; Li 1995). Another policy is the household registration system,

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[11] In China, the provincial government decides the detailed family planning policy, which should be in line with the national population control policy.

[12] The data available does not distinguish rural and urban areas, but is based on administrative locations. However, most rural population lives in counties, while urban residents live in cities and towns. It is not clear from the data source that whether the population include 'the floating population' (see Chapter 5).

which has been implemented sine the late 1950s[13]. The policy effectively curbed rural-urban migration (as well as migration within urban areas and within rural areas) until the 1990s, and thus created a physical and geographical segregation between cities and villages. These two policies, along with policies that provided much better medical care system for people in cities than that for people in villages, have generated two population groups in rural and urban China. The former group has a relatively higher fertility rate than the latter group, yet relatively shorter life expectancy (Wu 1991).

This rural-urban segregation has become blurred since the 1990s, when voluntary, large-scale rural to urban migration began. Millions of farmers have come to cities to find jobs. Attracted to higher income and an expected better life, many of them try to stay (See Section 5.5.2 of Chapter 5; Nolan 1993; Hussain and Zhu 1996; Cai and Zhang 2000).

In fact, some local governments, especially in small towns and cities, have reformed the rigid household registration system to allow rural residents to become permanent urban residents by granting them urban household registration. For example, in some areas, farmers who invest a certain amount of money in towns/cities, and farmers who have lived in towns/cities for a certain period of time and have their own accommodation and formal jobs in cities, can apply for urban residency (Ban and Zhu 2000).

Rural to urban migration changes the age structure in both villages and cities. As discussed in Section 5.5.2 in Chapter 5, given the difficulties of migration and the lack of entitlement for rural migrants in cities[14], most of the floating population in cities are young people, who are more likely to find employment in cities, which are mostly physically demanding jobs. Young rural migrants increase the scale of the labor force in cities, while leaving both the very young and old people behind in villages. Even though this internal migration cannot change the overall population age structure in China, it can make the urban population 'younger', and the rural population 'older' than it would otherwise be (Yan 1999).

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[13] For details of the system, see Chapter 3.
[14] Recall from Chapter 3 that major social security and welfare benefits only covered employees in state-owned work units, who must have local urban residency.

However, this rural-urban migration may not affect the age structure of the population covered by social security scheme. Since most of these migrants do not have the city's household registration, they have little, if not at all, access to social security and welfare benefits that are available to the residents who are legally registered as local residents. In the case of the old-age pension scheme, young rural migrants do not directly reduce the old-age dependency ratio of the population covered by the scheme. As a result, they do not reduce the financial pressure of population aging on the old PAYGO scheme. The large number of young rural migrants can reduce the burden of the old PAYGO pension scheme, only if they are covered by the scheme. This can happen when the division of rural and urban residents is eliminated and the pension scheme covers all employees. Of course, this can only be possible when the household registration system is reformed so that it is not used to discriminate people of the entitlements of social security benefits in China. Although there is some evidence that the HRS has been relaxed somehow, it may take some time for the elimination of the division between rural and urban Chinese.

While the Chinese population is aging, factors such as government family planning policy as well as rural-urban migration can affect the speed of aging in different regions of China, especially those in cities. However, population aging in China may not be fully reversed by the government future changes of family planning policy, and will not be affected by rural-urban migrations. Population aging has profound implications for many aspects of the society and economy (Wu 1991; Schultz 1995). It is its impact on the finance of public pension schemes that this chapter is focused on.

6.3 Population Aging and the Public Pension System—The Implication on Government Pension Liabilities

As discussed, population aging is accompanied by rising old-age dependency ratios. In a public pension system that is financed by a PAYGO scheme, a higher old-age dependency ratio means that on average, each worker has to support more retirees. In particular, if the pension system is a defined benefit system, a higher old-age dependency ratio can generate financial pressure on the workforce (US Council of Economic Advisors 1997).

To carry the analysis a little bit more formal, this section looks at two alternative public pension schemes: a defined benefit, PAYGO system and a fully funded, defined contribution system. While these two schemes do not exhaust all possible public pension schemes, they are the basic ones that are often adopted in practice. Therefore, the analysis below is somewhat stylised, because it focuses on the extreme cases: a pay-as-you-go approach versus a fully funded approach. Public pension schemes in reality often have more aspects and have various combinations of these two schemes. The financial arrangements of the two schemes are discussed first. This is followed by an analysis of the implication of an aging population on the systems. The final part of this section briefly discusses 'transition costs' when a PAYGO pension system is transformed into a fully funded system.

6.3.1 Alternative Public Pension Schemes and Their Finance

6.3.2.1 Financing a Defined-Benefit, PAYGO Public Pension Scheme

A defined-benefit, PAYGO scheme is specified as follows. The government collects revenues from current workers through a payroll tax, paid by employers or employees or both, and uses the revenue to pay pensions of current retirees. The pension benefits of retirees are pre-determined and fixed. In order to have revenues equal to expenditures, ignoring administration costs, the government faces a simple equation for each period of time:

$$t * N_W * W = N_R * B_p \tag{6-1}$$

where t is the tax rate on wages, N_W is the number of workers paying taxes for the public pension program, W is average taxable wages of workers covered, N_R is number of retirees covered by the system, and B_p is average pension benefits per retiree. It follows that to achieve balance for each period, the (payroll) tax rate required to finance the scheme is determined by the following equation, which is the same as equation (4-3) in Chapter 4:

$$t = \frac{N_R}{N_W} * \frac{B_p}{W} \tag{6-2}$$

Equation (6-2) shows that the payroll tax rate is determined by two ratios: the retiree/worker ratio, N_R / N_W, or the so-called 'system dependency ratio'; and the average pension benefit/ average wage ratio, B_p/W, or the so-called aggregate replacement rate. The higher the system dependency ratio, the higher the tax rate has to be, *ceteris paribus*; similarly, a higher aggregate replacement rate demands a higher tax rate.

In equation (6-2), the aggregate replacement rate is defined as the ratio of the average pension of current retirees and the average wage of current workers. In practice, in a defined benefit, PAYGO scheme, pension benefits are often specified as the ratio of pensions (per month) to wages (per month) of the retiree prior to retirement. To show this, equation (6-2) is written as follows[15]:

$$t = \frac{N_R}{N_W} * \frac{B_p}{W_R} * \frac{W_R}{W_W} \qquad (6\text{-}3)$$

where W_R and W_W represents the average wages of current retirees and current workers, respectively. Thus W_R/W_W is the ratio of the average wage of retirees (during their working life) to that of the current workers. It can be regarded as an indicator of the growth of (average) wages over generations. The smaller the value of W_R/W_W, the faster the (average) wage grows.

Equation (6-3) provides another angle to examine how the tax rate of financing the PAYGO pension scheme can be determined. The payroll tax rate is the product of the system dependency ratio, N_R/N_W; the average replacement rate of pensions, B_p/W_R, and the ratio of the average wage of retirees to that of current workers, W_R/W_W, which is an indicator for the change of wages. Equation (6-3) shows that the tax rate increases with the system dependency ratio and the replacement rate of pensions, but decreases with increases of wages over generations. From the financial balance point of view, in this defined benefit scheme, where the replacement rate is fixed, faster wage rises, and/or lower dependency ratio of the population covered by the scheme, can keep the tax rate low. When the increase of wages slows down, and/or the dependency ratio rises, the tax rate must rise in order to maintain the same replacement rate.

The old public pension system in urban China was a defined benefit, PAYGO system before its recent reforms. Even though there was no explicit payroll tax to collect revenues, it would be interesting to see what the above relationship would suggest about the effective tax rates was over time, if the system was financially balanced each year. Due to data limitations, equation (6-2) is used to illustrate the calculations. The data used are for state-owned work units only, since the old pension schemes mainly covered employees of these work units. Figure 6-7 shows system dependency ratios (that is, the retiree/worker ratios), the average pension/average wage ratios, and the total pension/total wage ratios between 1980 and 1998[16]. According to equation (6-2), to finance the PAYGO public pension scheme within the state-owned work units each year, the effective tax rate, t, on wages must be equal to the total pension/total wage ratio. Since the replacement rate (B_P/W) was very high[17] at the beginning of this period, the implicit tax rate was fairly close to the system dependency ratio, that is, the retiree/worker ratio, in the diagram. Between 1985 and 1998, the replacement rate was lower but was stable. As a result, the effective tax rate for the balanced finance became lower than the retiree/worker ratio, but follows its trend fairly closely. The steadily rising retiree/worker ratio suggests the system was under increasing financial pressure, due to an aging population covered during this period[18]. The effective tax rate on wages for the PAYGO pension system increased from about 7 per cent in 1980 to 25 percent in 1998, while the retiree/worker ratio increased from 8 percent in 1980 to 32 percent in 1998.

The Chinese case shows that in a defined benefit, PAYGO public pension system, the payroll tax rate required for current workers to finance pension payments has to rise in line with the system dependency ratio. In fact, as discussed in Chapter 4, rising and unbalanced dependency ratios of SOEs triggered the initial pension reform—social pooling of pension funds in the mid-1980s. Other reforms in the 1980s and 1990s, such as employee contribution and expanding pension coverage to all urban employees, were also driven by the financial pressure of the old PAYGO system. After the latest pension

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[15] This follows Arron (1999).
[16] Pension reforms started before 1998, and the pension system had become partially funded. However, the calculation assumes the old PAYGO system waa still applied until the end of this period.
[17] It is unusual that the aggregate replacement rate in 1980 was 100%. This may be due to the fact that some retirees receive higher pensions than their wages, especially some government officials.
[18] For more details of the rising dependency ratio of the system, see section 2 of Chapter 4.

reform in 1997, the system has a scaled-down PAYGO portion, with the target payroll tax rate of 17 per cent.

6.3.1.2 Financing a Defined Contribution, Fully Funded Public Pension Scheme

A defined-contribution, fully funded public pension system works as follows. Through mandatory contributions (by employers or employees or both), a percentage of workers' wages is put into a fund, which is then invested. Both contributions and returns on investments are accumulated for future pension payments. The system may or may not use individual accounts to accumulate contributions for each individual. In practice, a fully funded public pension scheme is often associated with using individual accounts. Further analysis of individual accounts is in Chapter 7. Assume that an individual's pension can only be drawn from his/her own accumulated contributions. Consider a two-period model, where a representative individual works during the first period, and contributes to pension funds. The fund available at the beginning of the second period, when the individual reaches retirement age, is given by:

$$B = (\tau * W)(1+r) \tag{6-4}$$

where B is the total pension funds available, τ is the mandatory contribution rate (as a percentage of wages), W is total wages of the individual during the working life, and r is the rate of return on pension funds. The formula indicates that total pension funds available for the individual increase with his/her lifetime wages, contribution rate, and the rate of return on pension funds.

Equation (6-4) can be written as follows to be able to compare with the PAYGO pension system directly:

$$\tau = \frac{1}{1+r} * \frac{B_P}{W_R} \tag{6-5}$$

where B_P is pension benefits of the retiree and W_R is the retiree's wage during the working period. They are the same number as B and W in equation (6-4).

Equation (6-5) provides some basic characteristics of a balanced, fully funded public pension scheme. For example, in a defined contribution, fully funded system, where τ is constant, pensions? as a proportion of wages? B_P/W_R, declines when the return on pension funds, r, is lower than expected. Alternatively, if a fully funded public pension system aims at achieving a certain level of defined benefits? a constant B_P/W_R , it has to increase contribution rate, τ, *ceteris paribus*, when the rate of return on pension funds, r, is lower.

Despite the obvious differences between the financing of a defined-benefit, PAYGO public pension scheme and a defined contribution, fully funded public pension scheme, there are important similarities in terms of the role of government in both schemes. If a government takes on all responsibilities of operating and managing a public pension scheme, including pension funds, public pension liabilities are generated when payroll tax, or mandatory contributions are collected. In both cases, the government makes a promise for future pension benefits, which is pre-determined in the PAYGO system discussed in this section. However, in the fully funded system as defined in this section, such pensions are variable, depending on other factors, such as those in equation (6-5). Ideally, workers who pay pension contributions would expect the government to ensure the market return on pension funds as well as the safety of funds for their retirement (more on this in Chapter 7).

6.3.2 The Impact of Population Aging on the Financing of Alternative Public Pension Systems

The simple decomposition of a balanced finance of a public pension scheme shows that population aging has implications on a PAYGO public pension system, while it has no direct impact on the fully funded system. Table 6-3 compares the finance of the two pension schemes, including the impact of population aging and economic growth. Results are based on equations (6-3) and (6-5). The finance of the PAYGO and the fully funded systems are as defined in the last section, but the comparison allows the system to be either defined benefits, or defined contributions. The purpose of this comparison is to examine the differential impact of population aging and economic growth on the two systems.

The main factors that affect the financing of a pension system can be summarized into two categories (see Table 6-3): (1) the growth factor—the rise of average wages over generations in the PAYGO scheme, and return on capital in the FF scheme; (2) the population aging factor? the system old-age dependency ratio. When the population is aging, to achieve a given level of defined benefit? a fixed replacement rate B_p/W_R, the payroll tax rate (t) in the PAYGO system must rise, while the mandatory contribution rate (τ) in the FF system remains unchanged. When population is aging, if the public pension system aims to maintain a fixed payroll tax/contribution rate of workers, pension benefits (B_p/W_R) in the PAYGO pension scheme must drop, while it remains unchanged in the FF scheme. However, economic growth, through rising rate of returns on labor, tends to offset the financial stress of a PAYGO public pension system that caused by the population aging. In a FF pension scheme, a higher rate of return on capital could bring higher pension benefits, when the contribution rate is fixed[19].

6.3.3 Transition Costs of Pension Reforms

Another factor that affects public pension liabilities is the 'transition costs' (World Bank, 1997), if a government wants to reform a PAYGO pension scheme to a fully funded one. As mentioned previously, these 'transition costs' are really the implicit public pension liabilities generated by a PAYGO system, which become explicit when replaced by a funded system, and therefore not a real cost of pension reform at all. A PAYGO system effectively involves inter-generational transfers of wealth: tax collected from current workers pays the pensions of current retirees. However, the first generation of retiree in the PAYGO system do not contribute to the program during their working lives. Ignoring this implicit debt of pensions does not lead to serious errors if the system carries on forever in a stationary state so that each working generation pays for retirees. However, the accounting error cannot be ignored when the PAYGO system is changed to a funded system. During such a transition, the government must finance the pensions of current retirees, since they have paid their contributions during their working years.

These transition costs are public pension liabilities. In particular, if the old PAYGO pension scheme has defined benefits, the amount of this government debt is pre-

[19] The issue of return on accumulated pension funds is further discussed in Chapter 7.

determined. While pensions must be paid to current retirees during the transition from the old PAYGO to the new funded pension system, how to finance this debt needs to be considered carefully, if the government wants to minimize the negative impact of the transition costs of pension reforms.

6.4 A Theoretical Model of Optimal Taxation Policy to Finance Public Pension Liabilities over Time

Barro (1979) sets up a simple model for government's optimal choices between taxation and debt to finance government expenditures. His model provides a general framework for optimal taxation/debt issue of a government over time. It suggests that, under certain assumptions, there is an optimal tax rate that is constant in each period that minimises the taxation costs imposed on the economy. Barro's model is briefly described in Appendix 6.1 to this chapter. Further examinations of Barro's model in Appendix 6.1 suggest that certain assumptions in Barro's model generate the key result of a time invariant optimal tax rate. In the model established in this section, these assumptions are assumed to be satisfied.

Barro's framework is applied in a model for optimal taxation decisions of a government to finance its public pension liabilities over time[20]. In particular, the government's problem is to minimize the deadweight losses associated with collecting payroll taxes to finance public pension liabilities, given an aging population during the foreseeable future[21]. In the setting of the basic model, it is different from the Barro's (1979) model in that it explicitly includes the growth of the economy, and it expresses the deadweight losses of taxation as an explicit function of the tax rate. Later on, an additional factor is included into the basic model to capture the nature of economic transition, which is relevant for the Chinese economy.

In this section, this new factor of economic transition that will be added to the basic model is discussed first. This factor is called the 'inefficiency coefficient' of the taxation system of a transition economy. It is assumed that collecting tax revenues incurs some

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[20] This model can apply to any government liabilities. The focus here is the pension liabilities and most of the current Chinese government revenues is from sources other than payroll taxes. See Section 6.4.1.

[21] At this stage, the detailed differences between a PAYGO and a FF scheme are ignored. It is assumed that all tax revenues are used for current and/or future pension payments. There will be some discussions of the differences of these two programs in Chapter 7.

administrative costs, such as wages of employees in the taxation system, and the loss of taxation revenues due to corruption. It is assumed that during the transition, the taxation system is becoming more efficient in collecting taxes over time, such that the administrative costs, as a proportion of taxation revenues, declines. Secondly, the basic model of the optimal taxation path for public pension liabilities is set up and the optimal tax rate is solved. At this stage, the economic transition factor is ignored. Finally, the optimal taxation path is solved when the economic transition factor is incorporated.

6.4.1 The Economic Transition and the Taxation System

Economic transition refers to reforms of a previously centrally planned economy towards a market-based economy, such as China and Vietnam. Take China as an example. Under the central planning, there were no 'regularised' taxation systems (McMillan and Naughton 1992: 130). The government had the power to allocate resources by owning firms, directing the uses of capital, labor and land, and determining prices (including wages), etc[22]. Taxation was implicit in government control of the price system. Government revenues mainly came from the operating surplus of firms it owned (McKinnon 1991). During the economic transition towards a market economy, economic reforms, such as those of the price system and of SOEs, significantly undermined the fiscal revenues (McMillan and Naughton 1992). In order to obtain revenues in a market economy, the government has to establish a new taxation system that is in line with the market mechanism. However, it takes time to build up such a system, and particularly so to have the new system operating efficiently, that is, to use the minimum administrative costs to collect a given amount of taxation revenues. During such an economic transition, the administrative costs of taxation, as defined previously, are expected to decline over time.

China's gradual reform strategy has allowed a steady although significant decrease of the government fiscal recourses. Figure 6-8 shows the share of total government (including both the central and the local governments) budgetary revenues in GDP during the period from the early 1950s to the end of 1990s. The figure has distinct features before and after the economic reform started in 1978. Before the reform, the

[22] Reviews of the social security system in China during the pre-reform era also reveal some of the nature of central planning. See Chapters 2 and 3.

share of the budgetary revenue in GDP fluctuated, but was always well above 25 per cent. During the twenty-year economic transition (1978-1999), while the economy was growing rapidly[23], government's budgetary revenues (as a share of GDP) declined. In 1995, it dropped to below 11 per cent, and then increased but only slightly, until the end of the period. The falling share of government revenues in GDP is unusual with rapid economic growth, but is in line with the declining of the government's control of the economy[24].

Before the taxation reforms in the 1980s and 1990s, a large proportion of government revenues came from enterprise revenues (mainly SOEs and large collective firms). Tax reforms introduced personal and enterprise income tax as well as changes of other taxes[25]. Figure 6-9 shows the share of non-tax revenues collected from enterprises and the share of taxes in total budgetary revenues in China. Before 1985, total budgetary revenues included taxes, revenues from enterprises, and other revenues such as 'revenues raised from funds for key construction projects in energy industry and transportation' (Lou 2000). Since 1985, subsidies to loss-making SOEs have been listed as a negative item in the budget. In the same year, income tax of enterprises was introduced to replace the previous revenues from (state-owned) enterprises[26]. In Figure 6-9, during the central planning period between 1952 and 1978, the share of tax revenues[27] in budget declined, while the share of non-tax revenues collected from enterprises rose. This trend changed after 1978, when the share of revenues from enterprises dropped significantly due to the poor performance of the SOEs. Since the enterprise income tax was introduced in 1985, taxation revenues became the most important source of budgetary revenues, which accounts for nearly 100 per cent in 1998[28].

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[23] According to the author's calculation, based on figures of nominal GDP and general retail price index in Lou (2000), during the 1978-1998 period, Chinese real GDP grew at an average of nearly 10 per cent per year.

[24] Economic reform is about relaxing government control of the economy. For example, in 1980, state-owned work units accounted for 82% of total fixed capital investment. By 1999, the share had dropped to 53% (author's calculation based on figures in SSB 2000b).

[25] For a description of the taxation reform in China, see Gordon and Li (2002).

[26] The reform began with large SOEs and not until 1994 that it was extend to all SOEs (Zhu and Sun 1994)

[27] During this period, tax revenues came from industrial and commercial tax (value added tax), tariffs and agricultural taxes (Lou 2000).

[28] There were couple of years when the share of taxation revenues was over 100%, since the subsidy to SOEs was listed as a negative item in budgetary revenue.

During the late 1990s, industrial and commercial tax was the most important source of taxation revenues of the Chinese government. It accounted for about 80 percent of revenues, followed by enterprise income tax (about 10 percent), agriculture tax and, finally, tariffs. Although individual income tax was introduced in the early 1980s, it only had a negligible contribution in the budget revenues (Lou 2000).

These observations suggest that economic transition from a central-planned economy towards a market economy could negatively affect government revenues, even though the economy is growing rapidly. While there are lots of reasons for this outcome (Wang and Hu 2001, McKinnon 1991), it is also reasonable to argue that the establishment of a new and efficient taxation system takes time. Similar to other new institutions, the new taxation system has to experience the 'learning and catching up' process, when new regulations and types of taxes are introduced, staff members are trained, and better technologies of modern taxation system are applied, etc. During this process, the new taxation system is expected to become more efficient in the sense that for a given amount of taxation revenues collected, the administrative costs are reduced. This feature of the taxation system of a transition economy is modelled later by adding an inefficiency coefficient of the taxation system to the basic model. This coefficient represents the proportion of total taxation revenues that are 'wasted', that is, a percentage of tax collected cannot be used to pay government pension liabilities. As a result, when this coefficient is added to the model, the revenue that can be used to pay these expenditures is the net tax revenue, which is gross tax revenue*(1-inefficiency coefficient). This percentage of tax revenue wasted is expected to decline over time, when the taxation system becomes more efficient. Thus this coefficient is expected to drop[29].

6.4.2 The Basic Model

The basic model for optimal taxation over time to finance government pension payments is set up as follows. It is assumed that payroll tax is the form of taxation for

[29] This assumption of increasing efficiency of the taxation system in China attempts to capture some of the features of the transitional nature of the Chinese economy. It makes the model more interesting. Results with and without this assumption are given. In practice, policy choice should base on whether this assumption is likely to hold in the economy or not, or whether the government adopts policies to increase the efficiency of the taxation system over time.

the government to finance pension liabilities. Output is assumed to be a quadratic function in employment, so that demand of labour is linear[30]. Labour supply function is also assumed to be linear. The standard Lagrange method is applied to find the optimal tax rate over time.

The setting up of the basic model ensures an analytical solution for the deadweight loss (DWL) of taxation. Figure 6-10 shows the economy for a particular period, t. the demand and supply curves of labor are straight lines. Quantity of labor is represented by the horizontal axis; wages, W, are on the vertical axis. A payroll tax (π)? ? expressed as a ratio (%) of the net wages to workers (W^s)? is collected. This tax drives a wedge between wages paid by employers, $W^s(1+\pi)$, and those received by employees, W^s . The DWL is represented by the usual triangle in Figure 6-10.

The government's objective is to choose π_t for each period so as to raise a given amount of revenues (in terms of its present values), denoted as τ_t, such that the present value of the deadweight loss, DWL, associated with the payroll tax is minimized. The government objective function, DWL, is expressed as in equation (6-6):

$$DWL = \sum_{t=1}^{T} \frac{DWL_t}{(1+r)^t} \tag{6-6}$$

where DWL_t is the deadweight loss of taxation in period t, r is the discount rate. T represents the last year of the planning horizon of the government.

The choice of the tax rate must satisfy the following budget constraint to finance government's pension liabilities, that is, the sum of (the present values of) taxation revenues in each period, τ_t, must be equal to the sum of (the present values of) government expenditures in each period, B_t, which is assumed to be exogenously given,

$$\sum_{t=1}^{T} \frac{B_t}{(1+r)^t} = \sum_{t=1}^{T} \frac{\tau_t}{(1+r)^t} \tag{6-7}$$

[30] This is the case with the assumption that firms maximise profits.

Using the usual Lagrange approach, the optimal tax rate for period t can be solved as a function of the Lagrange multiplier, and coefficients of the labour demand and labour supply functions. The process of obtaining the solution is in Appendix 6.2 to this chapter.

It is straightforward to show that when Barro's assumptions are satisfied in this model, the optimal tax rate is a constant over time. The proof is also in Appendix 6.2 to this chapter.

6.4.3 The Economic Transition Factor and the Optimal Tax Rates

Once the optimal tax rate for the basic model is solved, it is simple to incorporate the economic transition factor—the inefficiency coefficient of the taxation system—into the basic model. The inefficiency coefficient indicates that part of tax revenues are 'wasted' in the taxation system in the sense that they cannot be used by the government to pay its pension liabilities.

If this inefficiency coefficient is a constant over time, the optimal tax rate is still a constant, although the deadweight losses are higher, *ceteris paribus*. This is because the more tax revenues need to be collected. If the taxation system becomes more efficient over time, which is likely to be significant during economic transition, the inefficiency coefficient declines with time. This means that the optimal tax rate is time dependent: it is higher when the inefficiency coefficient is small and is lower when the coefficient is large. In the case that the taxation system becomes more efficient during the economic transition, the optimal tax rate for collecting tax revenues declines over time. These results are shown in Appendix 6.2 to this chapter.

6.5 Simulations of the Deadweight Losses Associated with Financing a Defined-benefit Pension Scheme Using Alternative Approaches

This section uses the results of the model in the previous section to examine the most efficient way of financing public pension liabilities when an economy is facing an aging population. In particular, two alternative approaches of financing are used to compare the differences of efficiency losses to the economy: a PAYGO year-by-year approach and an optimal tax approach.

Here the PAYGO year-by-year approach scheme collects just enough payroll taxes to finance pension expenditures each year. The optimal taxation scheme collects taxes according to the optimal tax rate for each period, but collects just enough taxes (in present values) that equal to (the present values of) public pension liabilities during a 50-year period between 2001 and 2050. In simulations, the impact of the economic transition factor—the inefficiency coefficient of the taxation system—is also considered.

6.5.1 The Simulation Methods

Since the current Chinese pension system covers only urban residents[31], simulations are based on the urban economy. The Chinese urban economy in 2000 is chosen as the base year. Parameters of the labour supply curve and labour demand curve are chosen to replicate the situation in urban economy in the base year. The estimation of parameters for the base year is discussed in Appendix 6.3 to this chapter. Given the information in 2000, parameters of labour demand function are determined. There is one degree of freedom in determining parameters of the labour supply curve. This is used to choose the wage elasticity of labour supply in 2000. To start with, this elasticity is chosen to be 1. Some sensitivity tests are conducted later to examine the impact of different values of this elasticity.

In the simulation model, the economy grows when the parameters of the labour supply and demand functions grow over time. The growth rates of these parameters are exogenous and it is assumed that the way they change satisfies Barro's assumptions for a constant optimal tax rate, as examined in Appendix 6.1 to this chapter. In other words, it is expected that the optimal tax rate is time invariant for the base model where the inefficiency coefficient of the taxation system is assumed to be zero. The optimal tax rate is expected to rise when the inefficiency coefficient is added, which increases with time. The required tax rate for the PAYGO year-by-year approach, of course, always rises with the rise of the expected retiree/worker ratio, as discussed in Section 6.3.2.1.

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[31] These are those residents who have the urban household registration.

To incorporate the factor of population aging into simulations, the expected retiree/worker ratio in urban China is estimated based on the projected population age structure of the Chinese population by the UN (2001). The details of calculating the expected retiree/worker ratios are in Appendix 6.3 to this chapter. The idea is to take the projected old-age dependency ratio[32] for the whole population as the base, but allow for factors that deviate the urban retiree/worker ratio from the old-age dependency ratio. This ensures that the retiree/worker ratio in the base year is the same as the actual statistics. The case when the urban population aging is as fast as the rural areas is the base scenario in the simulation. Simulations are also carried out for other two possible scenarios: 1) the urban population is aging at a faster rate compared with the rural population. For this scenario, the urban retiree/worker ratio is assumed to be 10% higher than the base retiree/worker ratio; and 2) the urban population is aging at a slower rate compared with the rural population. For this scenario, the urban retiree/worker ratio is assumed to be 10% lower than the base retiree/worker ratio.

Simulations are conducted for the base scenario of urban population aging when per capita GDP grows at a fast rate (6%/year), a medium rate (4.5%/year) and a slow rate (3%/year). These cases are listed in Table 6-4. The growth rate of urban employment is estimated to be 1.39%/year by Zhao and Xu (2002) based on the World Bank's (1996) projections. As discussed in Appendix 6.3 to this chapter, both the growth rate of employment and of GDP per capita depend on the growth rate of parameters in the labour supply and demand functions, as well as the payroll tax rate. If the tax rate is constant, which is true for the optimal taxation approach and when the inefficiency coefficient is constant, the growth rates of employment and GDP per capita are constant, and are functions of the growth rates of parameters only. As a result, once the growth rates of parameters are chosen, the growth rate of urban employment and GDP per capita are (roughly) determined.

The expected public pension liabilities are calculated based on the number of retirees, which is estimated using the expected retiree/worker ratio and the urban employment (details are in Appendix 6.3). The optimal tax rate is simulated for the baseline scenario of population aging when the economy grows at different rates. The deadweight losses

[32] This is defined as the number of people at retirement age (males 60+ and females 55+) to the number of people at working age (males 15-59, females 15-54), for the whole Chinese population.

(DWL_O) are calculated for each case. Once this is done, the PAYGO year-by-year tax rate is simulated and the associated deadweight losses (DWL_P) are calculated. The efficiency gains of following the optimal tax rate are defined as the percentage reduction of deadweight loses: the efficiency gains (%) = $100*(DWL_P-DWL_O)/DWL_P$.

6.5.2 The Simulation Results

6.5.2.1 An Efficient Taxation System

The first part of the simulation focus on the optimal tax rate for the basic model, when the inefficiency coefficient of the taxation system is assumed to be zero. This is the case when it is assumed that all tax revenues are used to pay the government pension liabilities and no revenues are wasted in the taxation system[33]. In these simulations, it is expected that the PAYGO year-by-year tax rate rise over time when the retiree/worker ratio increases due to population aging, while the optimal tax rate approach imposes a constant tax rate to minimise the deadweight losses.

The base scenario is simulated first, where urban population aging is the same as that in rural areas and the population age structure is based on UN's (2001) projection (medium variant fertility assumption), wage elasticity of labour supply is 1, and GDP per capita grows at 6% per year at optimum. The results are presented in Figures 6-11 to 6-15.

Figure 6-11 draws the population old-age dependency ratio calculated based on UN's (2001) projected age structure of the Chinese population, and the simulated results of the PAYGO year-by-year tax rate that is needed to finance pension payments. The old-age dependency ratio is defined as the number of people of retirement age (males aged 60+ and females aged 55+) to the number of people of working age (males aged 15-59 and females aged 15-54). The diagram confirms the direct linkage between the old-age dependency ratio and the tax burden of the PAYGO year-by-year financed public pension system, as discussed in Section 6.3.

Figure 6-12 shows the simulated results of the optimal tax rate and the PAYGO year-by-year tax rate. As expected, while the PAYGO year-by-year tax rate rises due to

population aging, the optimal tax rate is constant. In this particular scenario, the PAYGO year-by-year tax rate for pension payments has to rise from 13.3% in 2001 to 52.9% in 2050. The optimal tax rate smoothes out the burden over the whole 50-year planning period, yet it still requires a constant payroll tax rate of 34.8%. This suggests that for the economy that is facing rapid population aging in the near future, the current tax rate is too low, compared with the optimal tax rate that minimise the taxation costs of financing pension payments. The tax burden of future pension payments should be smoothed out over time in order to minimise the efficiency costs. It is also very clear from this diagram that even the optimal payroll tax rate is very high. This raises concerns about the high tax burden for a defined-benefits PAYGO public pension scheme in Chinese cities.

In Figures 6-13 to 6-15, simulated results of urban employment, net wages to workers and pre-tax wages of the PAYGO year-by-year approach and the optimal approach are compared. Higher payroll tax rates reduce net wages and discourage labour supply (when wage elasticity of labour supply is positive), but increase pre-tax wages, *ceteris paribus*. Since the PAYGO year-by-year tax rate is lower than the optimal tax rate during the early years when the retiree/worker ratio is relatively low, but higher than the optimal tax rate later when the retiree/worker ratio is relatively high, it is expected that urban employment and net wages are higher in the PAYGO year-by-year approach than that in the optimal approach initially, but are lower later on. The pre-tax wages are expected to be lower in the PAYGO year-by-year case but higher later on, compared with that in the optimal case. These expectations are confirmed in these figures; even though the gap between wages of these two approaches is very close and is hard to tell in the diagrams. 2029 is the year when the year0by-year tax rate becomes higher than the optimal tax rate. This is also the year when the two curves cross in these three figures.

When the growth rate of GDP per capita changes and when the wage elasticity of labour supply in 2000 is different, the numerical results change. However, the variations are not very significant. For example, when GDP grows at 3%/year and elasticity of labour supply is 1, the PAYGO year-by-year tax rate rises from 13.0% in 2001 to 57.0% in 2050, while the optimal tax rate is a constant of 30.3%. When GDP grows at 6% per

[33] The inefficiency coefficient is discussed in more details in Section 6.4.1.

year, but wage elasticity of labour supply is 0.5, the PAYGO year-by-year tax rate rises from 13.1% in 2001 to 54.8% in 2050, while the optimal tax rate is 35.5%. However, the key relationships between the variable of the PAYGO year-by-year scheme and the optimal tax scheme, such as those shown in Figures 6-13 to 6-15, remain.

Now turn to the issue of efficiency gains. In the basic scenario (GDP grows at 6%/year, wage elasticity of labour supply is 1 in 2000), the efficiency gains of following the optimal tax rate rather than the PAYGO year-by-year approach is 12.3%. This indicates that by adopting the optimal tax rate, the deadweight loss is reduced by 12.3% compared with that by following the PAYGO year-by-year approach (See Table 6-5).

These optimal tax rate and the efficiency gains are affected by the key assumptions of the simulations. For example, they are different when GDP per capita is assumed to grow at a slower rate, or when the wage elasticity of labour supply chosen for 2000 changes. The optimal tax rates and efficiency gains of some of these cases are summarised in Table 6-5.

In the same row of Table 6-5, the growth rate of GDP per capita is the same and therefore pension liabilities are the same[34]. The difference of the optimal tax rates and of the efficiency gains are due to the impact of the wage elasticity of labour supply chosen for 2000. For example, when GDP per capita grows at 6%/year, the optimal tax rate is 37.4% when the elasticity is 0.1, 35.5% when the elasticity is 0.5, and 34.8% when the elasticity is 1[35]. In all the cases simulated, when the labour supply curve becomes flatter, the optimal tax rate decrease, but the efficiency gains increase.

Along the same column of Table 6-5, the elasticity of labour supply is fixed. The differences of optimal tax rates and efficiency gains are due to the impact of the different growth rates of GDP per capita. For instance, for the case when wage elasticity of labour supply is 1, the optimal tax rate is 34.8% when GDP per capita grows at 6% per year, 33.2% when it grows at 4.5%/year, and 30.3% when it grows at 3%/year. Since the growth rate of employment is fixed at 1.39%/year, the number of retirees is

[34] See details of the simulation methods in Appendix A6.3.

[35] When the wage elasticity of labour supply increases, parameter b_t rises while a_t decreases. In the simulations, λ also increases. However, it can be seen from equation (A6.2-24) in Appendix A6.2 that whether the optimal tax rate rises or drops is undetermined.

not affected by the growth rate of GDP per capita. However, the higher the growth rate of GDP per capita, the higher the growth rate of average pensions (to maintain the constant replacement rate). Again, the analytical solution does not indicate whether the optimal tax rate would increase or decrease. In these simulations, the optimal tax rate rises when GDP per capita grows at a higher rate, for all the three cases of elasticity of labour supply is 1, 0.5 and 0.1.

Tables 6-6 to 6-9 summarise simulation results for some of the key variables in the case when optimal tax rate is imposed. Tables 6-6 and 6-8 compare these variables across different wage elasticity of labour supply when GDP per capita grows at 6% and 3%, respectively. Tables 6-7 and 6-9 compare these variables across difference GDP growth rate when wage elasticity of labour supply in 2000 is chosen to be 1 and 0.5, respectively. It can be seen from these tables that the impact of the wage elasticity of labour supply chosen for 2000 and the growth rate of GDP per capita assumed has impact on the (constant) optimal tax rate. For the base scenario when urban population aging is as fast that in villages, the optimal tax rate that smoothes out the rising payroll tax over the 50-year period is between 30% and 37%.

6.5.2.2 An Inefficient but Improving Taxation System

To examine the impact of an inefficient taxation system on the simulation results, the first simulation examines the extreme case of an inefficient taxation system: it is assumed that the taxation system in China is inefficient and its efficiency is not improved during the 50-year period. The inefficiency coefficient, α, as defined previously, is the percentage of taxation revenues wasted. In other words, for every yuan of taxation revenues, only $(1-0.01\alpha)$ yuan can be used to pay public pension liabilities. As explained in Appendix 6.3, α in 2000 is estimated to be 7.5%. With this assumption, the simulations for the base scenario? urban population aging is as fast as that in rural areas? are carried out for the three cases of different growth rate of GDP per capita (as shown in Table 6-4), and for different values of wage elasticity of labour supply. The results are presented in Figure 6-16 and in Table 6-10.

Since the taxation system is inefficient, it is necessary to collect more tax revenues for any given public pension liabilities, *ceteris paribus*. Therefore, it is expected that both

the PAYGO year-by-year tax rate and the optimal tax rate is higher, *ceteris paribus*, compared with that when the coefficient is zero. Since the inefficiency coefficient of the taxation system is assumed to be constant overtime, the optimal tax rate is also constant. These are clear in Figure 6-16. When GDP per capita grows at 6% per year and wage elasticity of labour supply is 1, the PAYGO year-by-year tax rate increases from 14.2% in 2001 to 63.8% in 2050, while the optimal tax rate is 39.9%. Compared with the case when the taxation system is efficient (Figure 6-12), the PAYGO year-by-year tax rate is only about 1 percentage point higher in 2001, but more than 10 percentage points higher in 2050, while the constant optimal tax rate is increased by about 5 percentage points. The results show that the inefficiency of the taxation system exacerbates the financial burden of an aging population, especially when the retiree/worker ratio is high. This is because taxation revenues do not increase proportionally with tax rate. Instead, the taxation revenue is a quadratic function of the tax rate: at the left-hand side of the Laffer curve where taxation revenues increase with tax rate, the slope of the curve is positive but declines. This indicates that the ratio of the % increase of tax revenues to the % increase of tax rate declines when the tax rate rises. In the simulations, this Laffer curve effect is clearly the result of endogens wage rate and labour supply. When a higher payroll tax rate is imposed, it reduces net wages, employment and thus the taxation base. As a result, taxation revenues increase at a declining rate when the tax rate is higher[36].

Table 6-10 compares the optimal tax rate and the efficiency gains when the taxation system is inefficient with that when the system is efficient. The case that this table summarises is the base scenario of population aging and GDP per capita grows at 6%/year. Due to the inefficiency of the taxation system, the optimal tax rate is expected to be higher. When the taxation system is inefficient, both the PAYGO year-by-year tax rate and the optimal tax rate are higher, *ceteris paribus*. The change of efficiency gains, which is the percentage reduction of deadweight losses by following the optimal tax rate instead of the PAYGO year-by-year tax rate, depends upon individual cases. As shown in Table 6-10, the optimal tax rate is about 5 percentage points higher when the taxation system is inefficient, compared with the case when it is efficient, for all three values chosen for the wage elasticity of labour supply in 2000. In these three cases, it

[36] Of course, the tax revenues eventually decline with the tax rate when the tax rate is too high. In the simulations, cautions are taken to make sure that the tax rate is at the left-hand side of the Laffer curve.

turns out that the efficiency gains are higher when the taxation system is inefficient. The extra efficiency gains range from 0.2 to 2 percentage points when the elasticity chosen varies from 0.1 to 1.

Further simulations are conducted to examine the impact of improved efficiency of the taxation system on the optimal tax rates as well as the efficiency gains by following the optimal tax rate. To focus on this factor, the simulations are conducted for the base scenario, where urban population aging is as fast as that in rural areas, the wage elasticity of labour supply in 2000 is chosen to be 1, and GDP per capita in cities grows at 6% per year.

When the initial inefficient coefficient of the taxation system, denoted as α, is estimated to be 7.5% in 2000, how fast the taxation system become more efficient affects the optimal tax rates as well as the efficiency gains. The faster the system becomes more efficient, the less waste of taxation revenues, and the lower the required tax rate, *ceteris paribus*. Three cases are simulated: 1) α declines slower than the growth rate of GDP per capita, at 3% per year; 2) α declines at the same rate as the growth of GDP per capita, at 6% per year; 3) α declines faster than the growth rate of GDP per capita, at 9% per year. Both the PAYGO year-by-year tax rate and the optimal tax rate are lower. The simulation results for these three cases of the PAYGO year-by-year tax rates and the optimal tax rates are presented in Figures 6-17 to 6-19, respectively.

In these figures, the optimal tax rate rises, although very slightly, due to the improvement of the taxation system over time. In the first case when α declines at the rate of 3%/year, the optimal tax rate is 36.3% in 2001 and rises to 38.2% in 2050. In the second case when α declines at the rate of 6%/year, the optimal tax rate is 35.1% in 2001 and rises to 37.4% in 2050. It rises from 34.7% in 2001 to 36.9% in 2001 in the third case when α declines at the rate of 9%/year. In all the three cases as shown in Figures 6-17 to 6-19, the PAYGO year-by-year tax rate is far below the optimal tax rate during the early years of the 50-year period when the population aging is relatively low, but well above the optimal rate when the retiree-worker ratio becomes high. In the first case when α declines at the rate of 3%/year, the PAYGO year-by-year tax rate is 14.2% in 2001 and rises to 58.3% in 2050. In the second case when α declines at the rate of

6%/year, the PAYGO year-by-year tax rate is 14.1% in 2001 and rises to 57.3% in 2050. It rises from 14.1% in 2001 to 57.0% in 2001 in the third case when α declines at the rate of 9%/year.

The impact of the efficiency of the taxation system on the tax rates and efficiency gains is summarised in Table 6-11, where the PAYGO year-by-year and the optimal tax rates as well as efficiency gains for the inefficient taxation system (inefficiency coefficient is fixed at 7.5%), the improving efficiency taxation system and the efficient taxation system (the inefficiency coefficient is zero) are listed. For the purpose of comparison, in all the relevant cases in Table 6-11, GDP per capita is assumed to grow at 6%/year, the wage elasticity of labour supply is assume to be 1. Obviously, the more efficient the taxation system, the lower the tax rate, for both the PAYGO year-by-year financing and the optimal taxation financing. The efficiency gains are the highest at 14.3%, when the taxation system is inefficient and remains to be so. They are the lowest when the taxation system is inefficient and its efficiency does not improve very fast. The lowest efficiency gains are about 12.2%.

Finally, some other simulations are conducted for the scenarios when urban population aging is faster or slower than that in rural areas. A faster population aging in cities could be the result of the following situation: the household registration system remains effective, the one-child policy is more effective in cities than in villages, and the pension scheme only covers people with urban household registration. The case simulated for this scenario is that the retiree/worker ratio in cities is assumed to be 10% higher than the base scenario, when the urban population aging is as fast as that in rural areas. On the other hand, a slower urban population aging than that in rural area is possible, for instance, in the situation when the household registration system is relaxed, and a large number of rural migrants, mainly young workers, come to cities to work and they are covered by the pension scheme. The case simulated for this scenario is that the retiree/worker ratio in cities is 10% lower than the base scenario, when the urban population aging is as fast as the rural areas. The simulation results for these two scenarios are presented in Table 6-12, for the case when GDP per capita grows at 6%/year and the wage elasticity of labour supply in 2000 is chosen to be 1. The results for the base scenario are also listed in the table for comparisons.

The results in Tables 6-12 show that: 1) the faster the speed of population aging, the higher the optimal and PAYGO year-by-year tax rates, *ceteris paribus*; For instance, compared with the PAYGO year-by-year tax rate of 57.3% in the base scenario in 2050, it is 49.5% if the population aging in cities is 10% slower, but it is as high as 65.8% if the population aging is 10% faster. Compare with the optimal tax rate of 37.4% in 2050, it is only 32.8% if the population aging in urban China is 10% slower, but as high as 42.2% if the population aging is 10% faster. 2) The speed of population aging also affects efficiency gains of following the optimal tax rate. In this particular case of simulation, the efficiency gains are the highest, 12.9%, when the urban population aging is faster than the base scenario. They are the lowest, 11.6%, when the urban population aging is slower than the base scenario.

6.6 Conclusions

This chapter is the first of the two chapters that focus on future policy options for public pension scheme in China. It examines public pension liabilities and their financing over a period of time, when the population is aging. In particular, it looks at the economic efficiency implications of alternative approaches in financing a defined-benefit public pension scheme in China during the next 50 years or so. A basic model of optimal taxation, based upon Barro's (1979) framework, to finance public pension liabilities is set up and solved. It is then modified to incorporate a feature of economic transition—inefficient taxation system. The solution for the basic and the modified models are used for simulations to examine the possible impact of population aging on Chinese government public pension liabilities, and the potential efficiency impact on the economy, by using alternative approaches to finance these pre-determined pension liabilities.

The trend of population aging in China during the next 50 years or so is clearly indicated by studies from various sources. These population projections show that the old-age dependency ratio of the Chinese population is expected to rise sharply. This is mainly due to the low fertility rate as the result of the government one-child policy since the late 1970s. However, there are factors that need to be considered when examining the burden of public pension liabilities in China, which currently only covers urban residents who have urban household registration. These factors include possible

relaxation of the one-child policy and the relaxation on rural-urban migration. Both factors may slow down the speed of population aging in cities, but how big these impacts may be needs careful studies, which has not been explored in this chapter.

The impact of population aging on public pension liabilities is discussed for two alternative schemes: a PAYGO scheme and a funded scheme. In both the case of a defined-benefit scheme and a defined-contribution scheme, population aging has no direct impact on the funded scheme. However, it generates financial pressure on the PAYGO scheme: an aging population requires increasing contribution rates in the defined-benefit scheme, or declining pension benefits in the defined-contribution scheme. If a government wishes to reform a PAYGO public pension scheme into a funded one, the previous implicit public debt of pension liabilities become explicit, and the government must finance them over time.

This chapter then analyses a fundamental issue in financing public pension liabilities: the economic efficiency of collecting sufficient tax revenues to pay pensions for an aging population covered by a defined-benefit public pension scheme. A theoretical model, based on Barro's (1979) framework of optimal debt issue, has been set up. The model assumes that the government's problem is to minimize the deadweight loss of financing an exogenously given stream of government expenditures, including pension payments[37]. In the basic model where the labour demand and labour supply function is linear, it is shown that Barro's result of a constant optimal tax rate holds, so long as his basic assumptions are satisfied. To satisfy these assumptions, while the parameters of the functions change to allow for the growth of employment and wages, they must change in a particular fashion. With these assumptions hold, the basic model has been solved to find the constant optimal tax rate. It is then used to include a feature of the taxation system in a transition economy such as China. The taxation system is assumed to be inefficient in the sense that parts of tax revenues are wasted and the net tax revenues is the difference between the gross revenues and the waste. However, the taxation system is expected to improve its efficiency over time. The solution of the model with this feature suggests that the optimal tax rate increases when the taxation system becomes more efficient.

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[37] The simulations in this chapter assume the payroll tax is only used to finance the public pension liabilities. The payroll tax, of course, can be used to finance other government expenditures as well.

The solutions of the model are then used to simulate the possible impact of population aging on pension burden on the economy, firstly when the taxation system is assumed to be efficient, and secondly when it is inefficient. Some sensitivity tests are also conducted to examine the impact of the speed of population aging, the growth rate of GDP per capita, and the wage elasticity of labour supply on simulation results. In these simulations, the emphasis is also on the efficiency gains by following the optimal taxation path instead of the PAYGO year-by-year tax rate.

The results confirm that population aging in China—as predicted by the UN (2001)—is expected to generate sharply rising taxation burden on workers to finance the public pension scheme on the PAYGO year-by-year base. For example, in the base case scenario[38], the PAYGO year-by-year tax rate rises from 13.1% to 52.9%, when the taxation system is assumed to be efficient. The tax rate is even higher if the inefficiency of the taxation system is considered (see table 6-11). Even a relatively slower population aging in cities, compared with that in villages, does not make the problem disappear. The worst case is when urban population aging is faster than that in rural areas. Neither the wage elasticity nor the growth rate of GDP per capita changes this conclusion, although they have some impact on the tax rates.

The simulation results suggest that there are potentially large efficiency gains by following the optimal tax rate instead of the PAYGO year-by-year tax rate. While the PAYGO year-by-year tax rate rises sharply due to fast population aging, the optimal tax rate smoothes out the taxation burden of pension liabilities: it is constant when the taxation system is efficient or the inefficiency coefficient remains unchanged, and rises slightly when the taxation system becomes more efficient over time. These efficiency gains are significant in all simulations, although they vary when factors such as wage elasticity of labour supply, the speed of population aging and the growth rate of GDP per capita change.

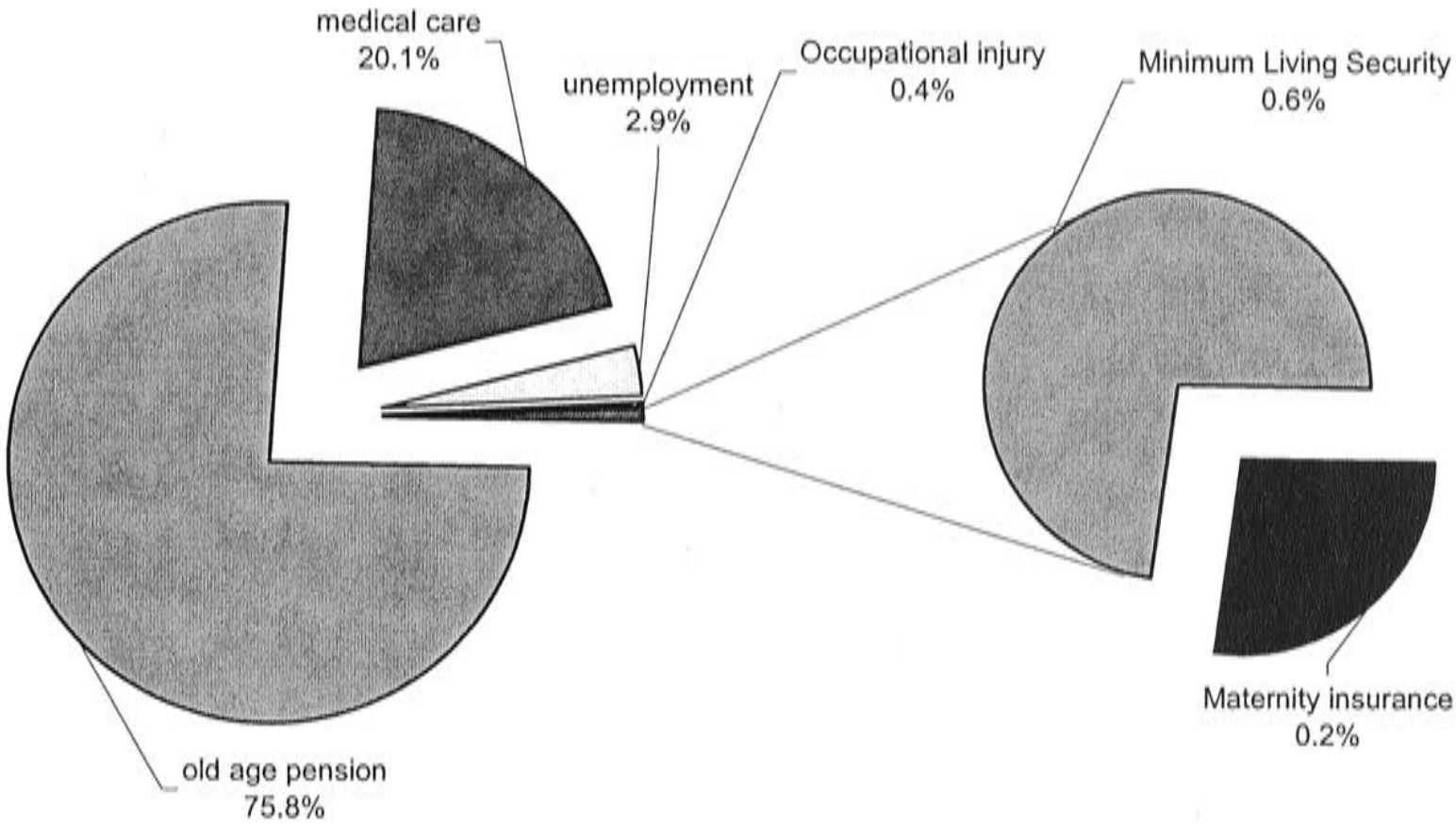
Despite the large efficiency gains by following the optimal tax rate instead of the PAYGO year-by-year rate, the tax burden of population aging alone on workers is still

[38] In this scenario, the urban population aging is assumed to be as fast as that in rural areas, the wage elasticity of labour supply is 1 in 2000, and the growth rate of GDP per capita is 6%/year. See Table 6-11.

very heavy. In most of the cases simulated, the optimal tax rate required is over 30%, which is very high and not feasible.

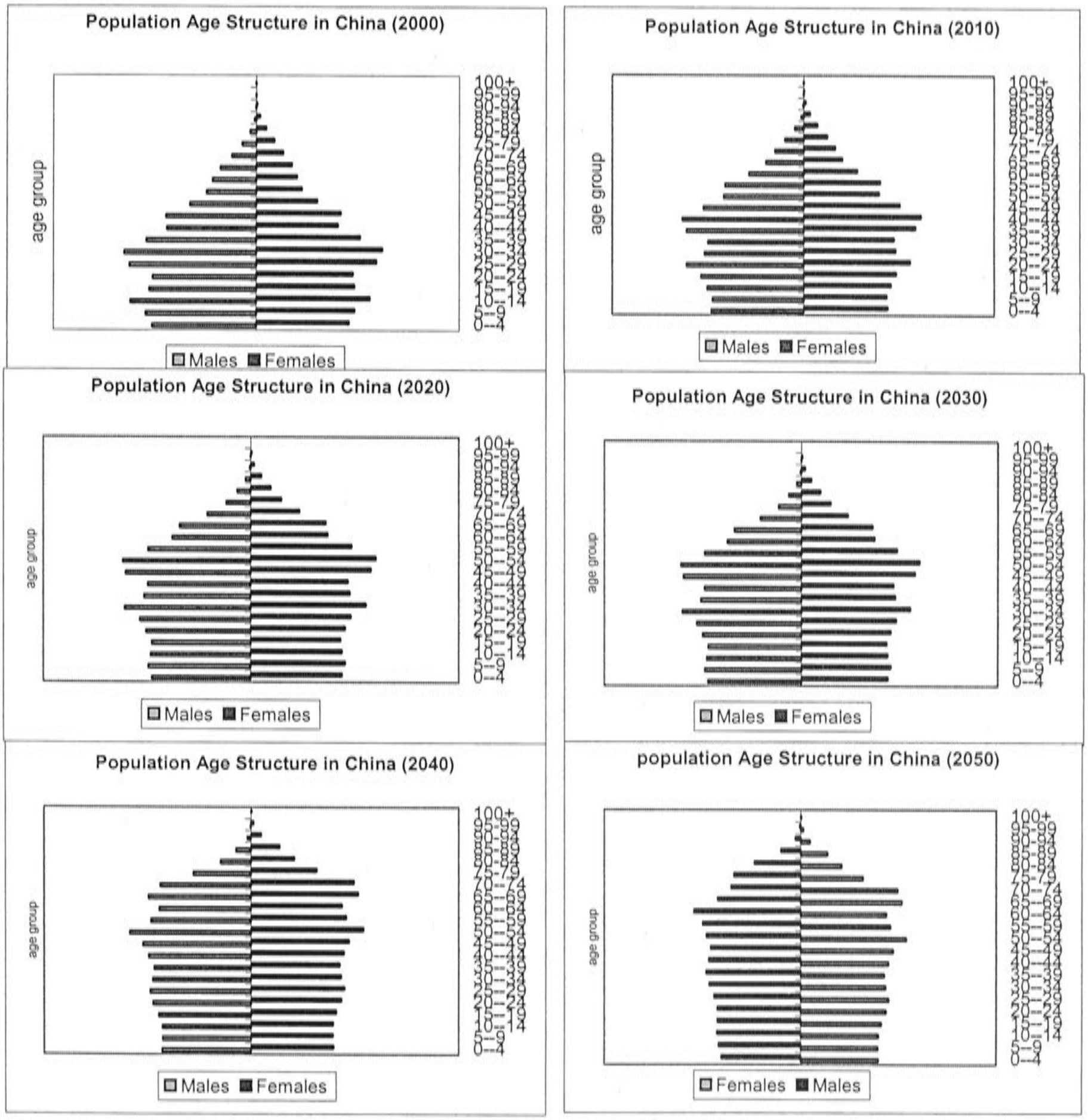
The results of this chapter raise the following points: (1) using payroll taxes to finance the old, defined-benefit PAYGO public pension liabilities in China on a year-by-year base in the near future is too costly and is not feasible; (2) the alternative—optimal tax rate approach that accumulates funds while the population is relatively young to finance the defined-benefit scheme—is not likely to be feasible either. The results strongly suggest that either the Chinese government need to consider using other sources to finance its public pension liabilities of the define-benefit PAYGO scheme, or undertake pension reforms. The next chapter will examine reform options using individual accounts to accumulate pension funds. It will examine the taxation impact of the current partially funded pension scheme in China versus a fully funded pension scheme with individual accounts.

Figure 6-1. Expenditure of Major Social Security Programs in China (1999)

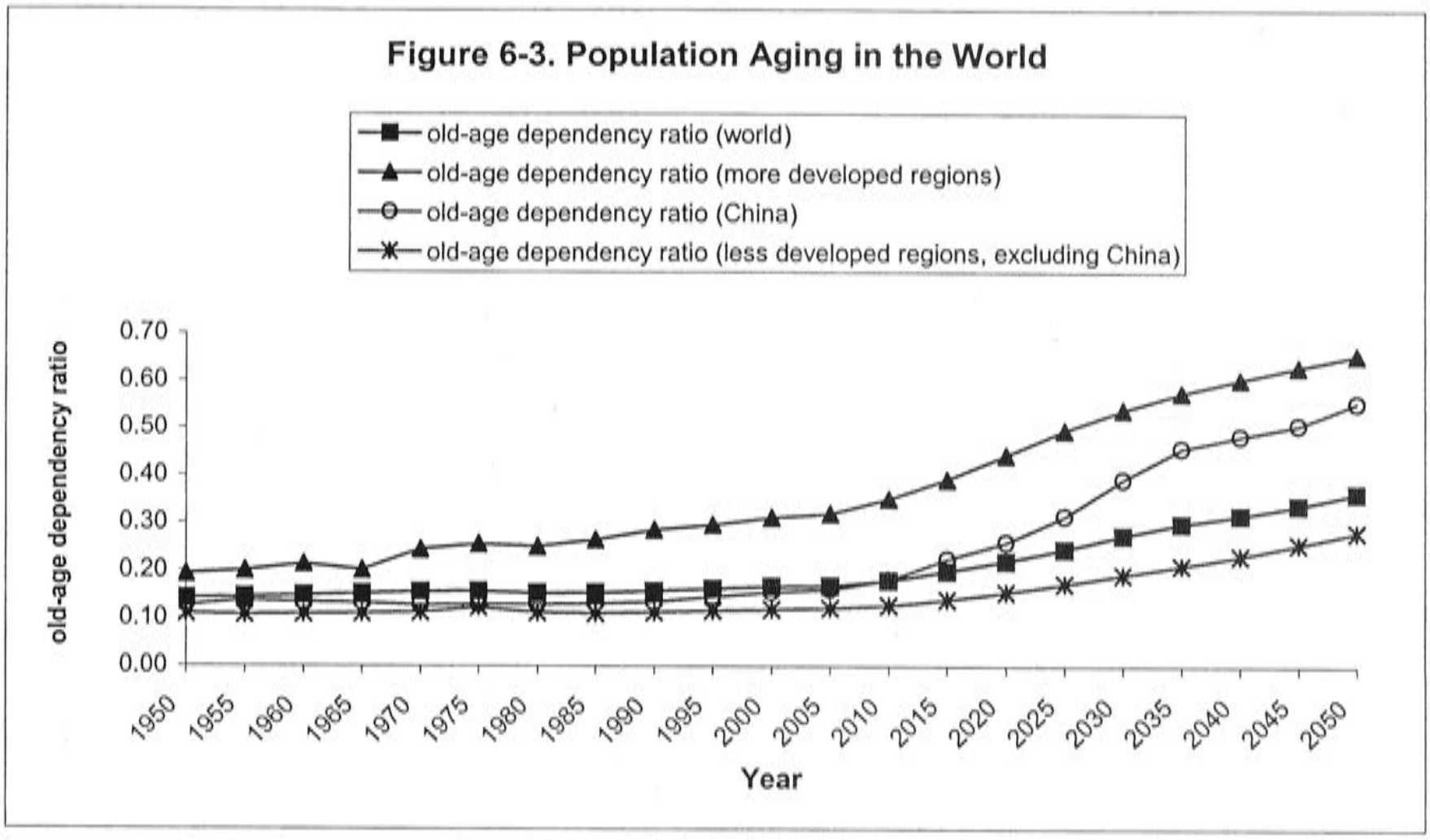


Source: Expenditures of old age pension, medical care, unemployment insurance, occupational injury and maternity insurance are from SSB (2000a); Figure for minimum living security program is from Shi (ed.) (2000).

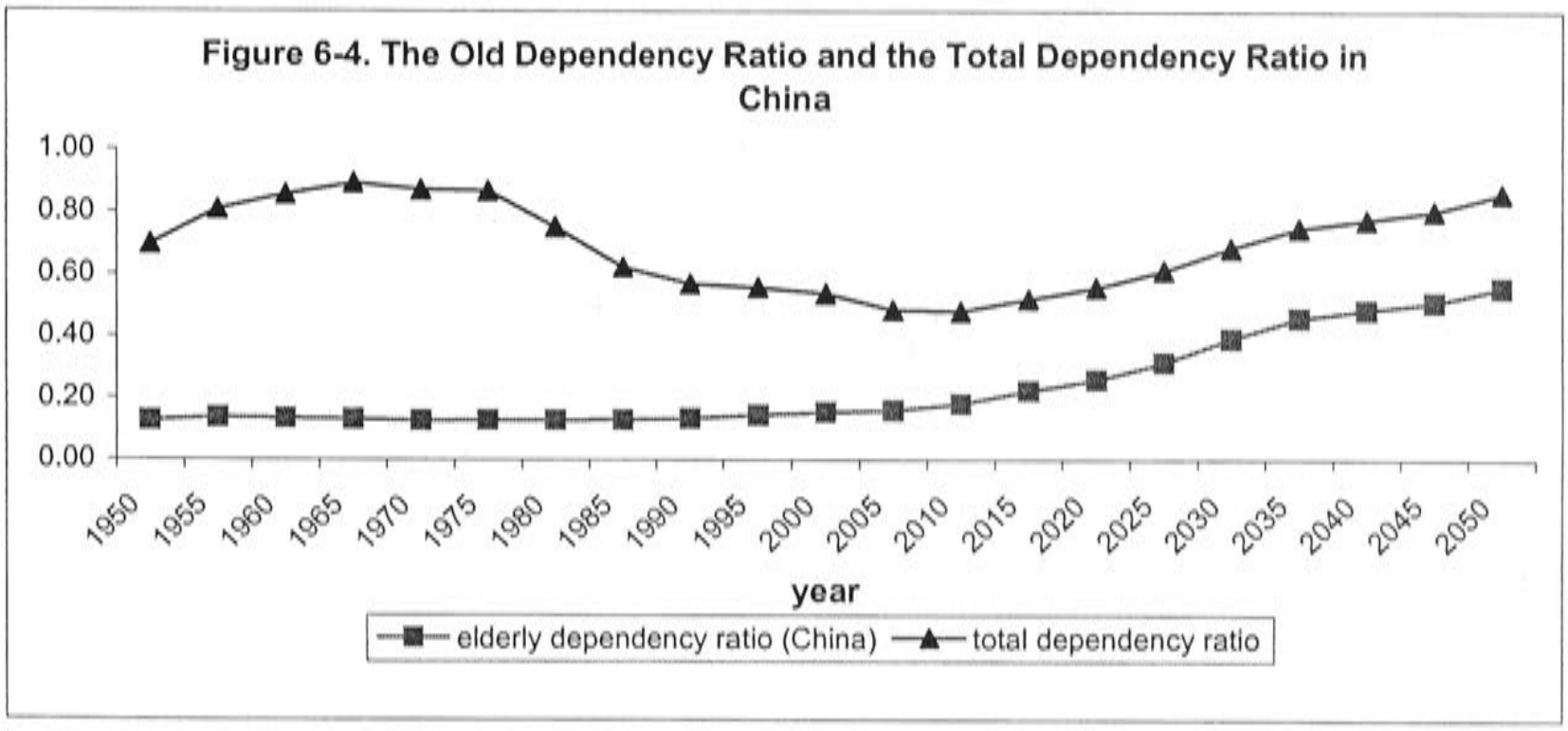
Figure 6-2. Population Age Structure in China (Forecasts for Selected Years)



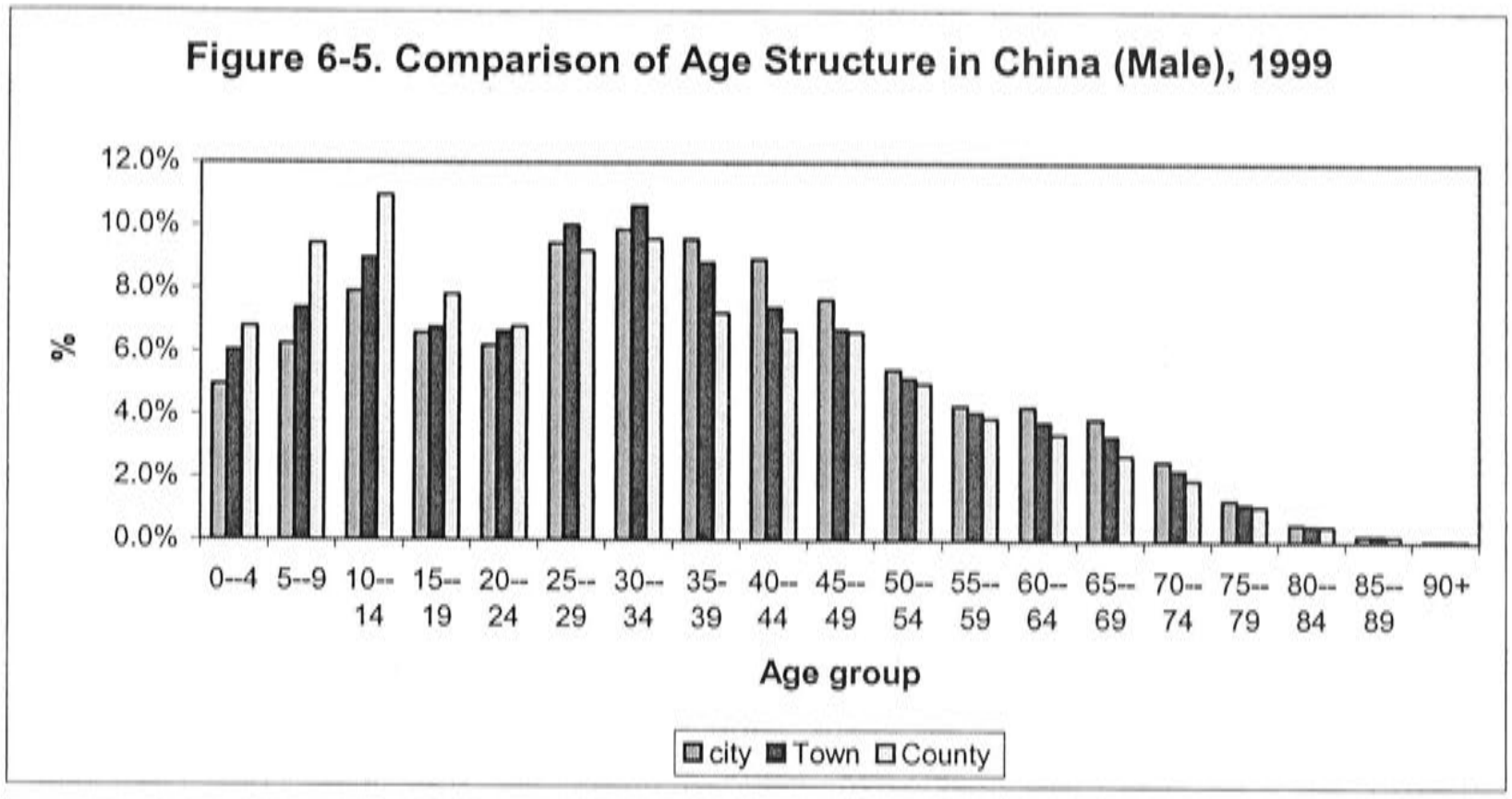
Source: author's construction based on figures on UN (1999).



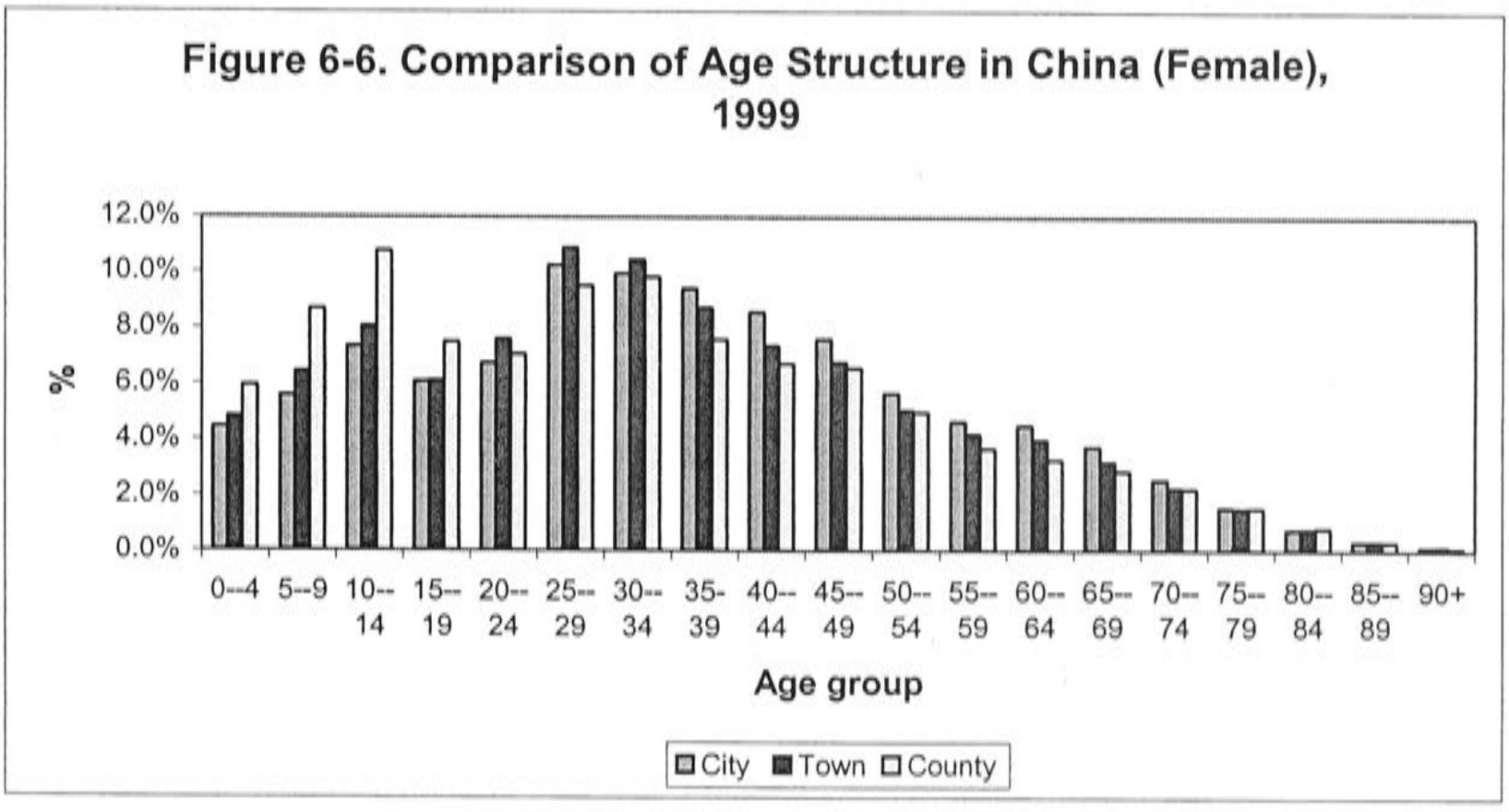
Note: The old-age dependency ratio is defined as the ratio of the number of people aged 60 and over to the number of people aged between 15 and 59.
a. the more developed regions comprise Europe, North America, Australia/new Zealand and Japan.
b. the less developed regions include all regions in Africa, Asia (except Japan), Latin America and the Caribbean plus Melanesia, Micronesia and Polynesia
Source: Author's construction based on UN (2001).



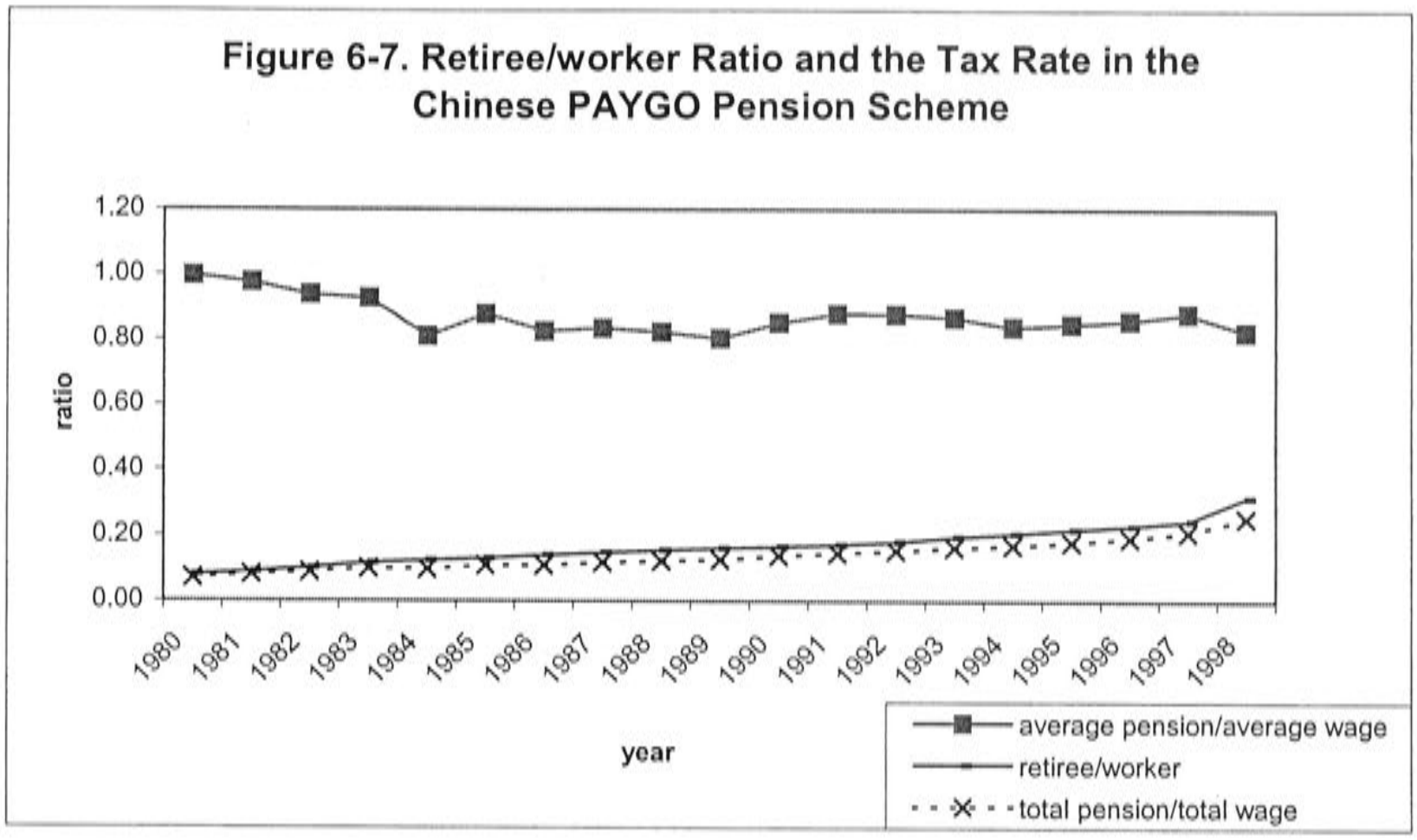
Note: Total dependent ratio is defined as the number of people aged under 15 plus aged 60 and over divided by the number of working-age people aged between 15 and 59; Aged dependency ratio is defined as the ratio of the number of people aged 60 and over divided by the number of working-age people.
Source: author's construction based on results of UN (1999).



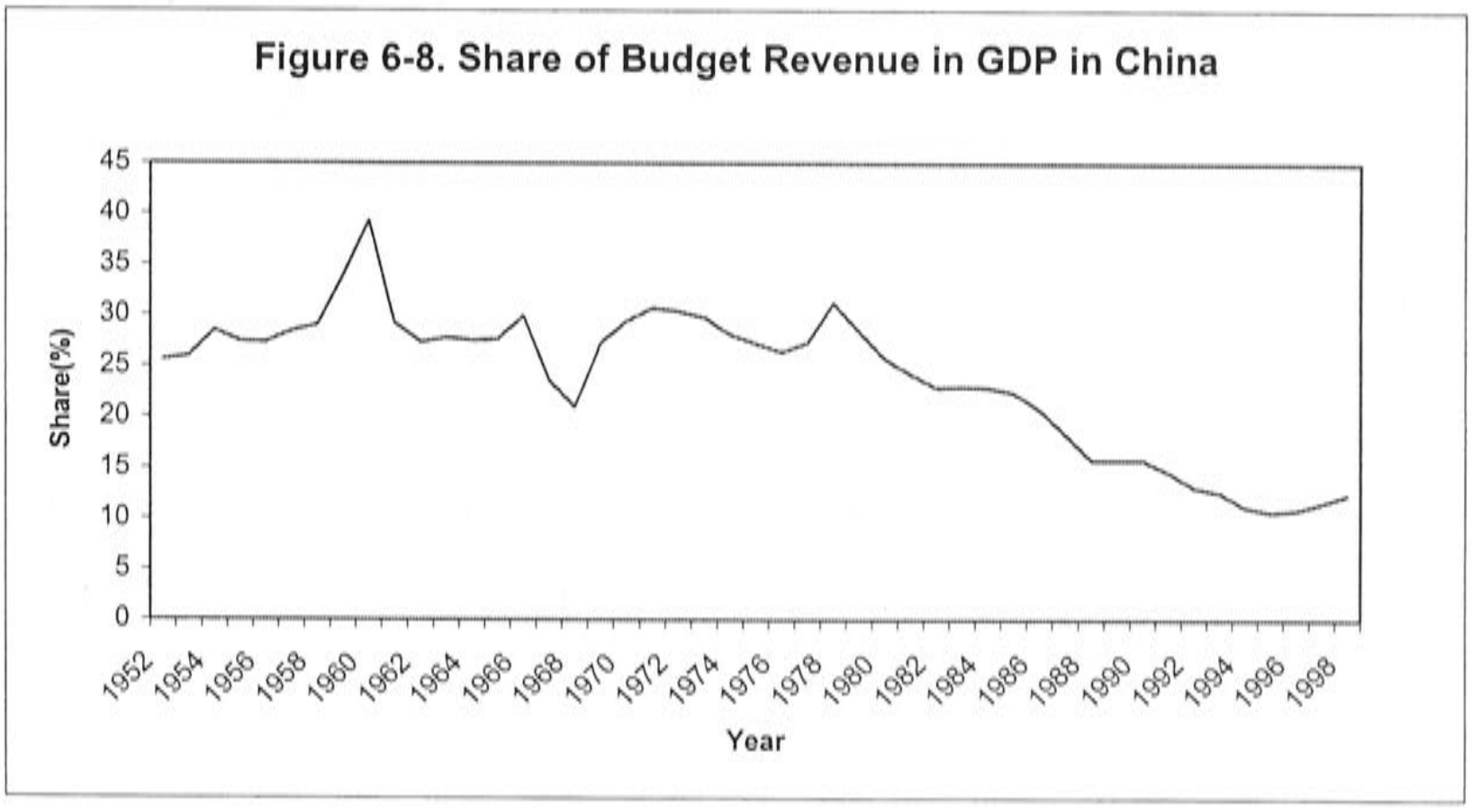
Source: author's construction based on figures of the Population Change Survey in SSB (2000).



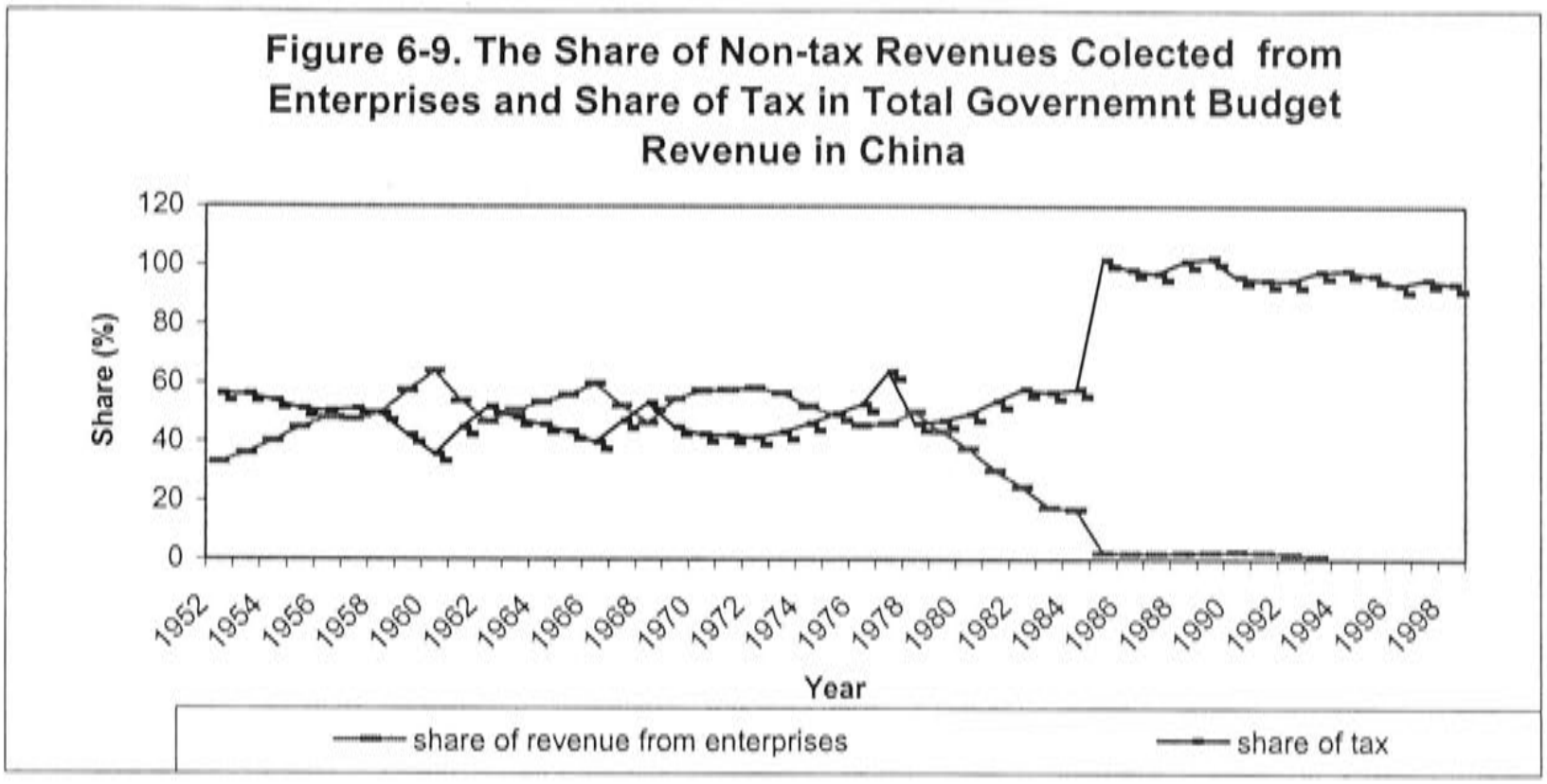
Source: author's construction based on figures of the Population Change Survey in SSB (2000).



Source: author's construction base on figures from SSB (1999).

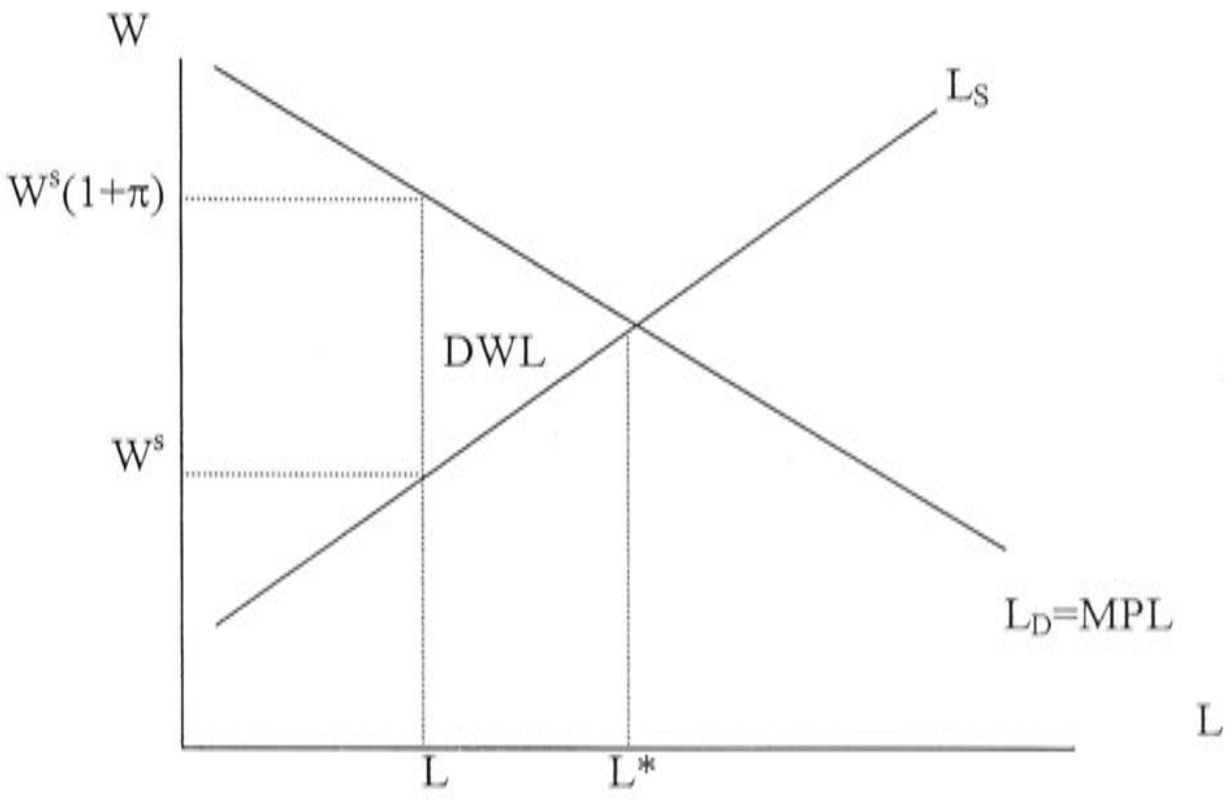


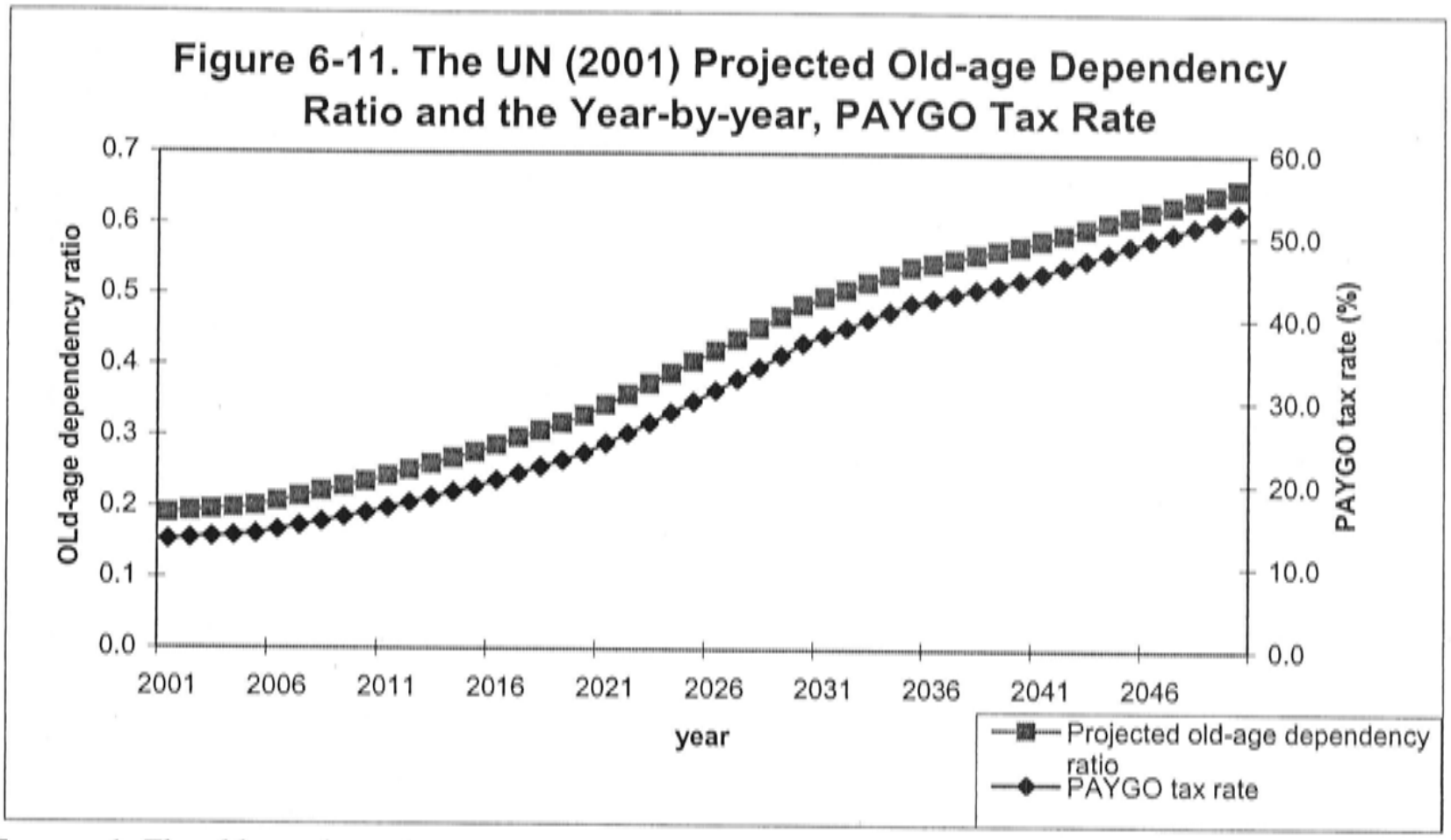
Source: author's construction based on table 2-1 in Lou (2000: 59-60).



Source: author's construction based on table 2-1 in Lou (2000: 59-60).

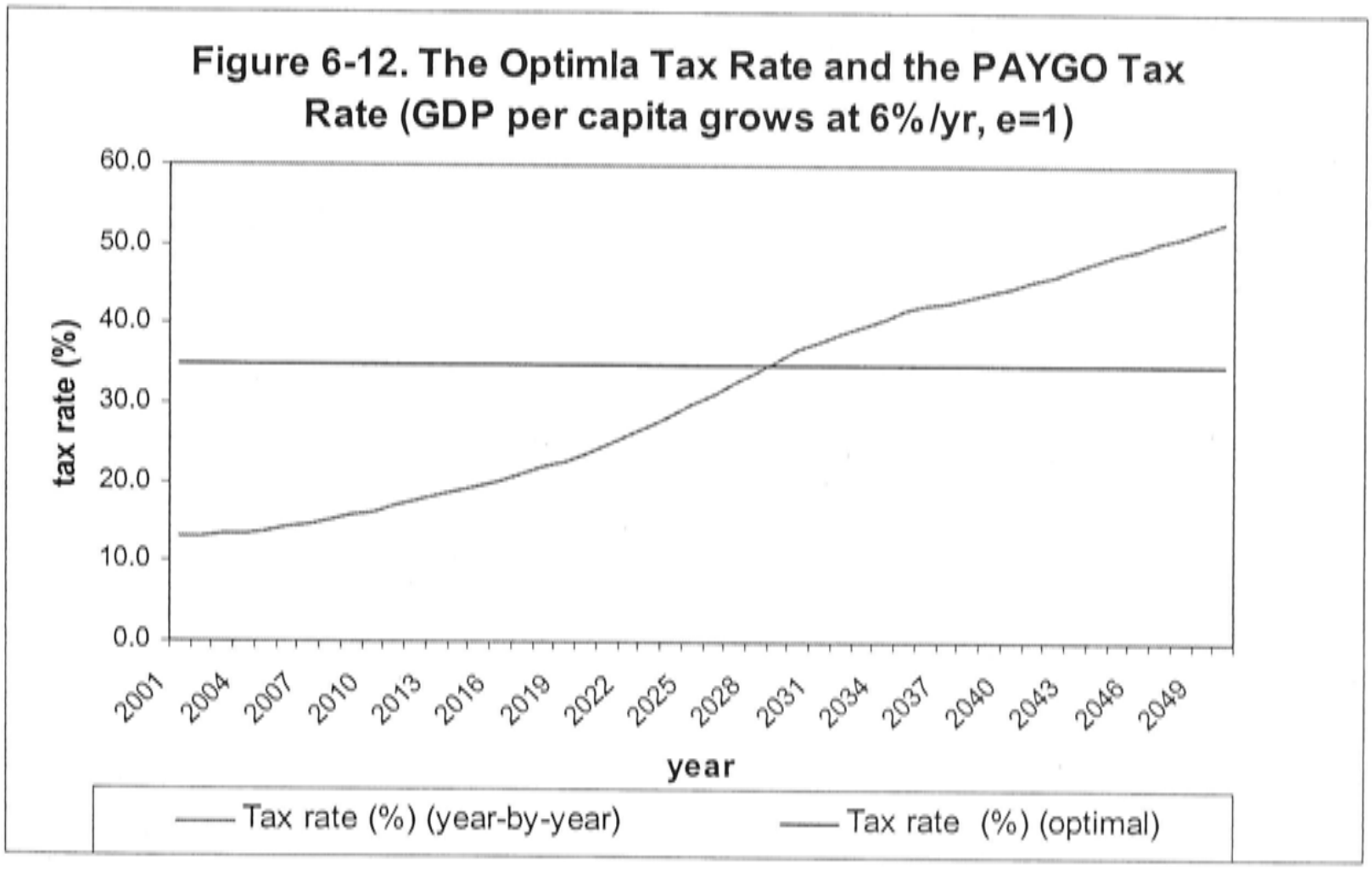
Figure 6-10. Dead Weight Loss of the Payroll Tax



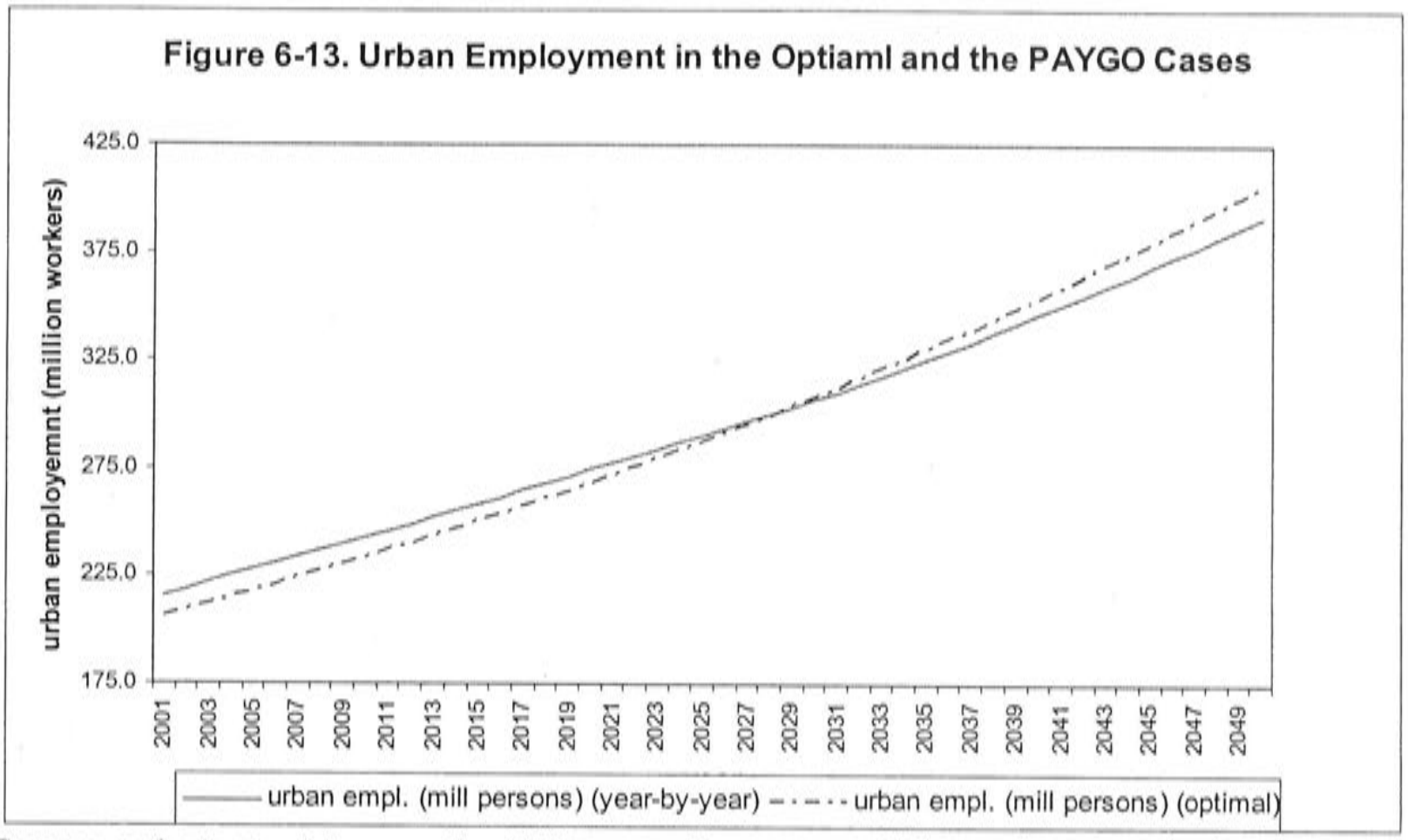


Source: 1. The old-age dependency ratio is calculated by the author based on UN (2001) projections (medium variant of fertility assumption). It is the number of people at retirement age (males aged 60+ and females aged 55+) to that at working age (males aged between 15 and 59, females between 15 and 54).

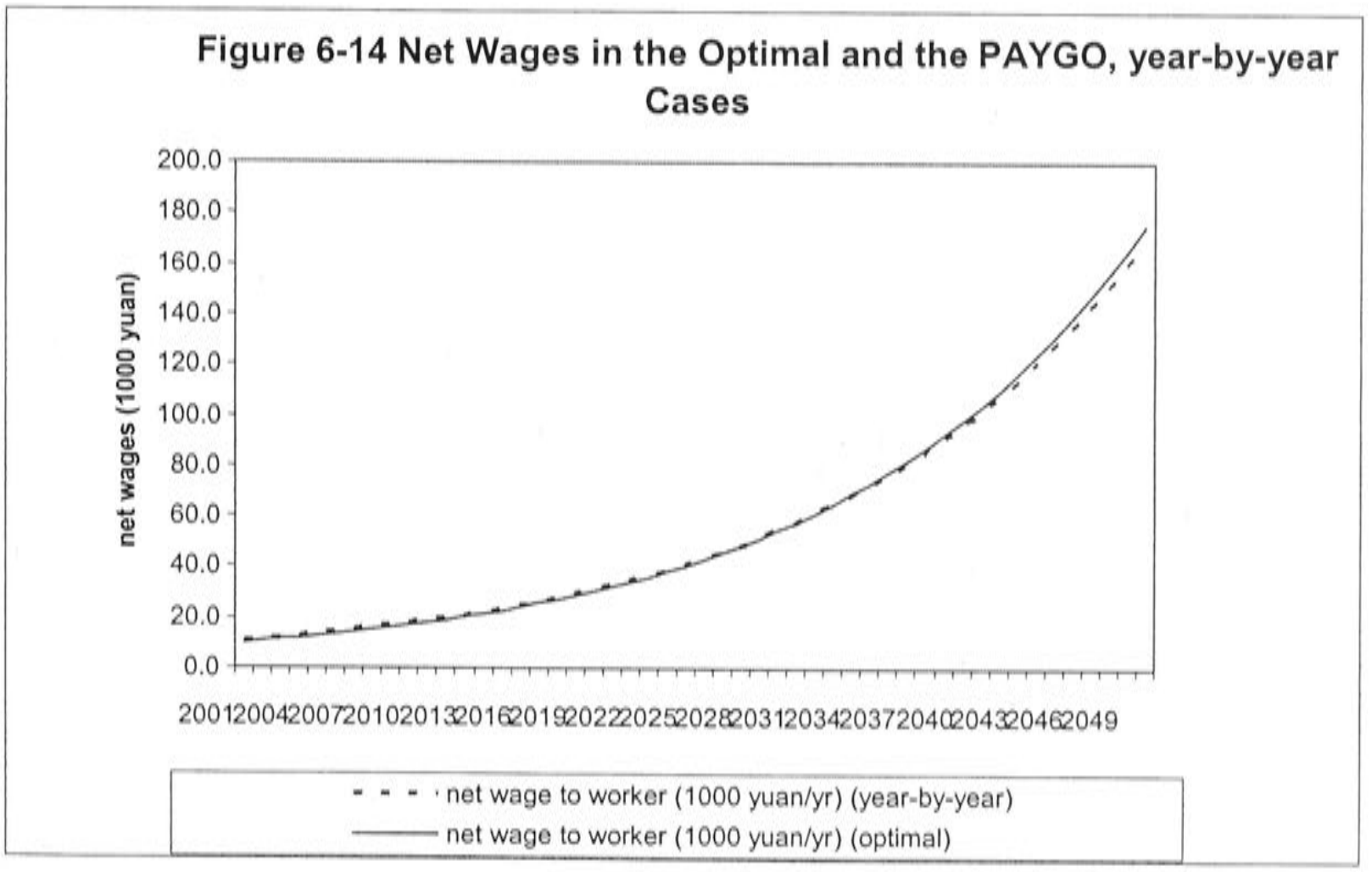
2. The PAYGO year-by-year tax rate is from author's simulation results for the base scenario of population aging, GDP per capita grows at 6%/year and the wage elasticity of labour supply is 1.



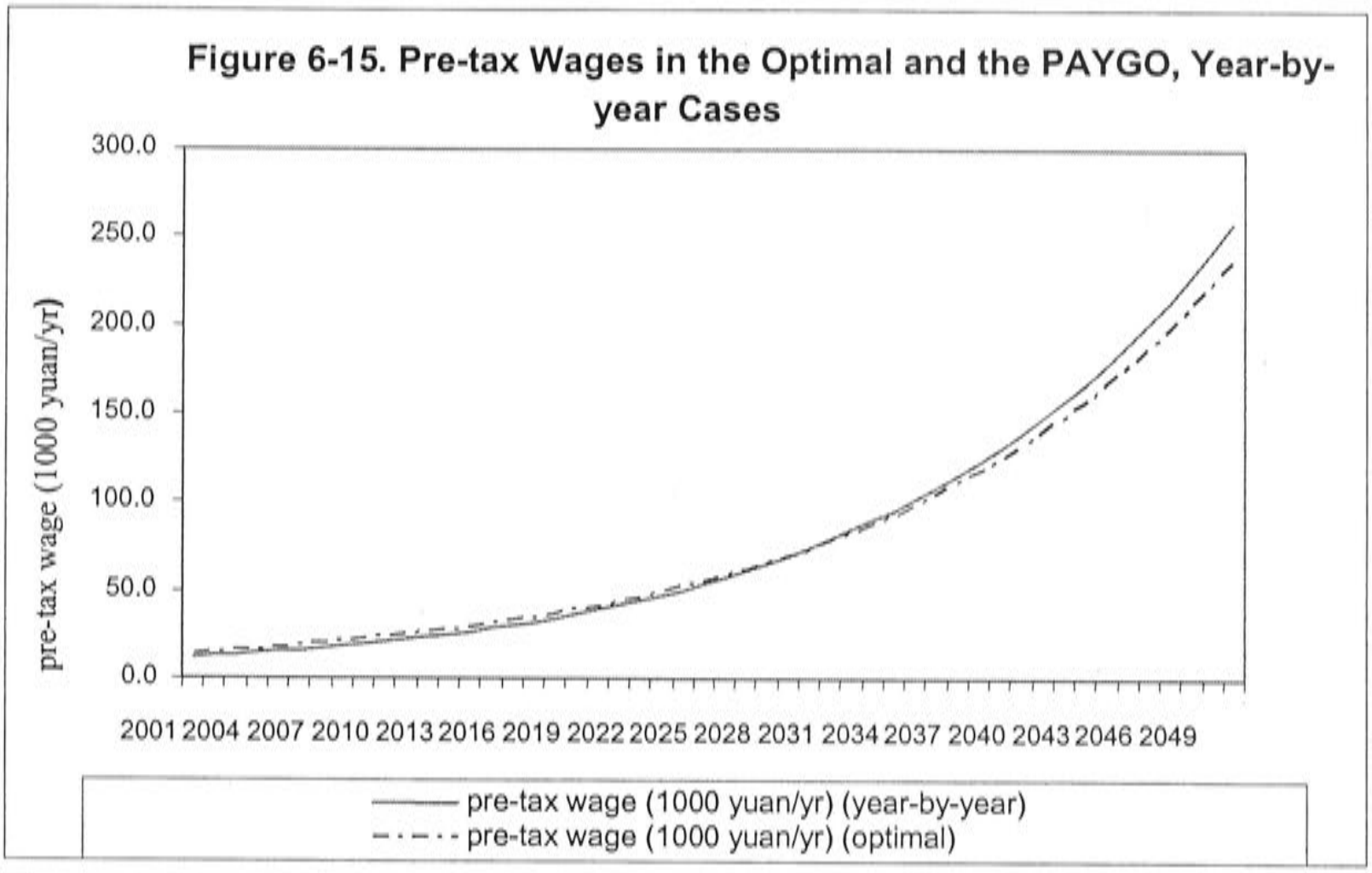
Source: author's simulation results.



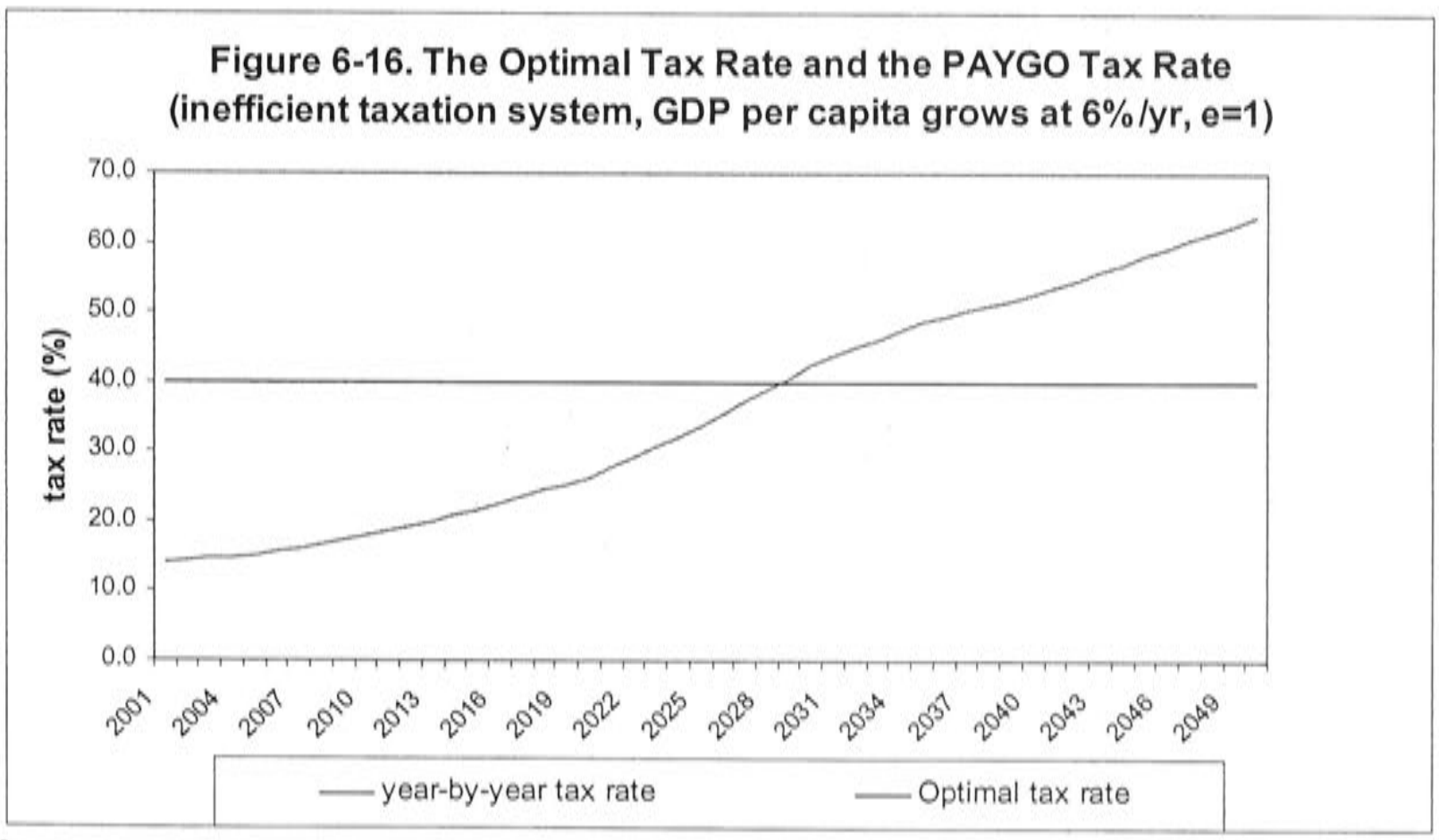
Source: author's simulation results. GDP per capita grows at 6%/year, the wage elasticity of labour supply is 1.



Source: author's simulation results. GDP per capita grows at 6% per year; the wage elasticity of labour supply is 1.

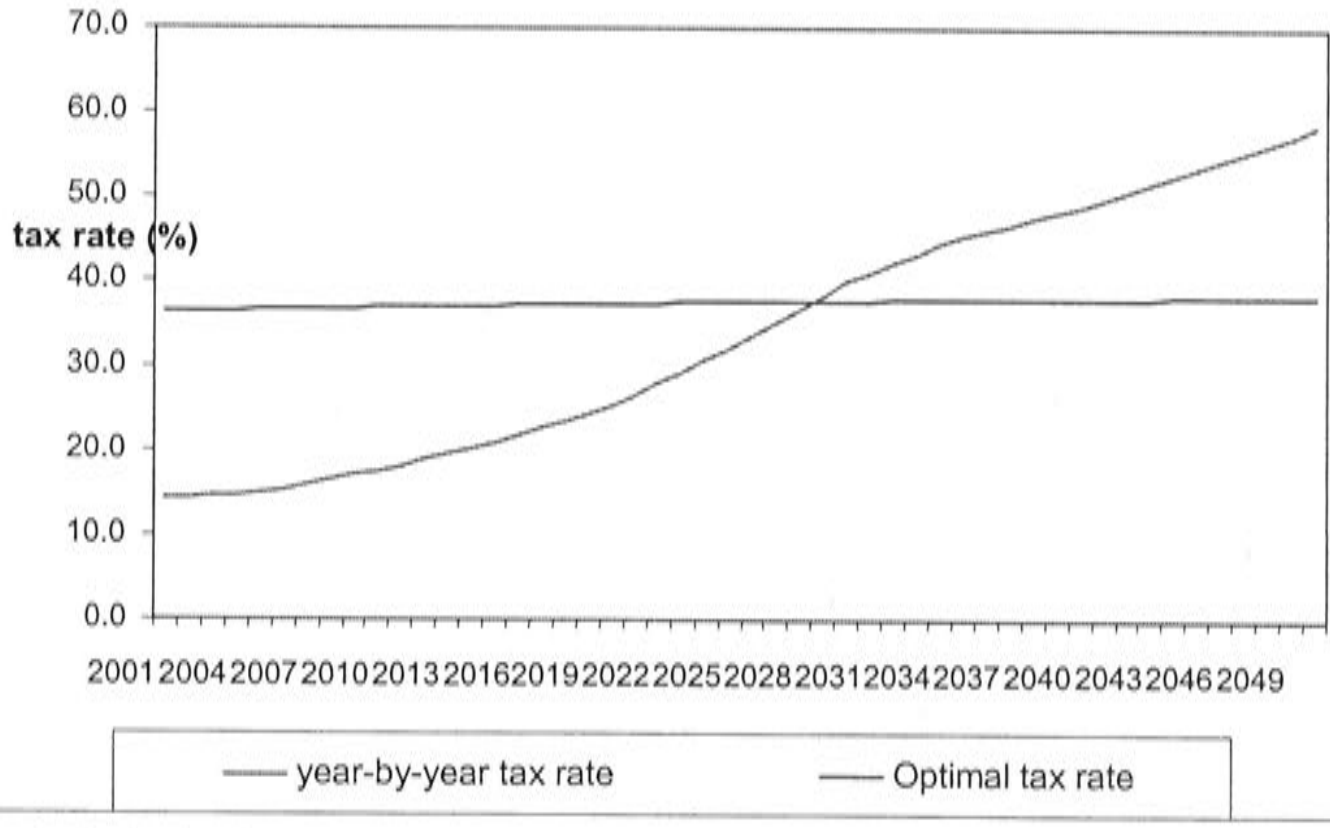


Source: author's simulation results. GDP per capita grows at 6% per year; the wage elasticity of labour supply is 1.



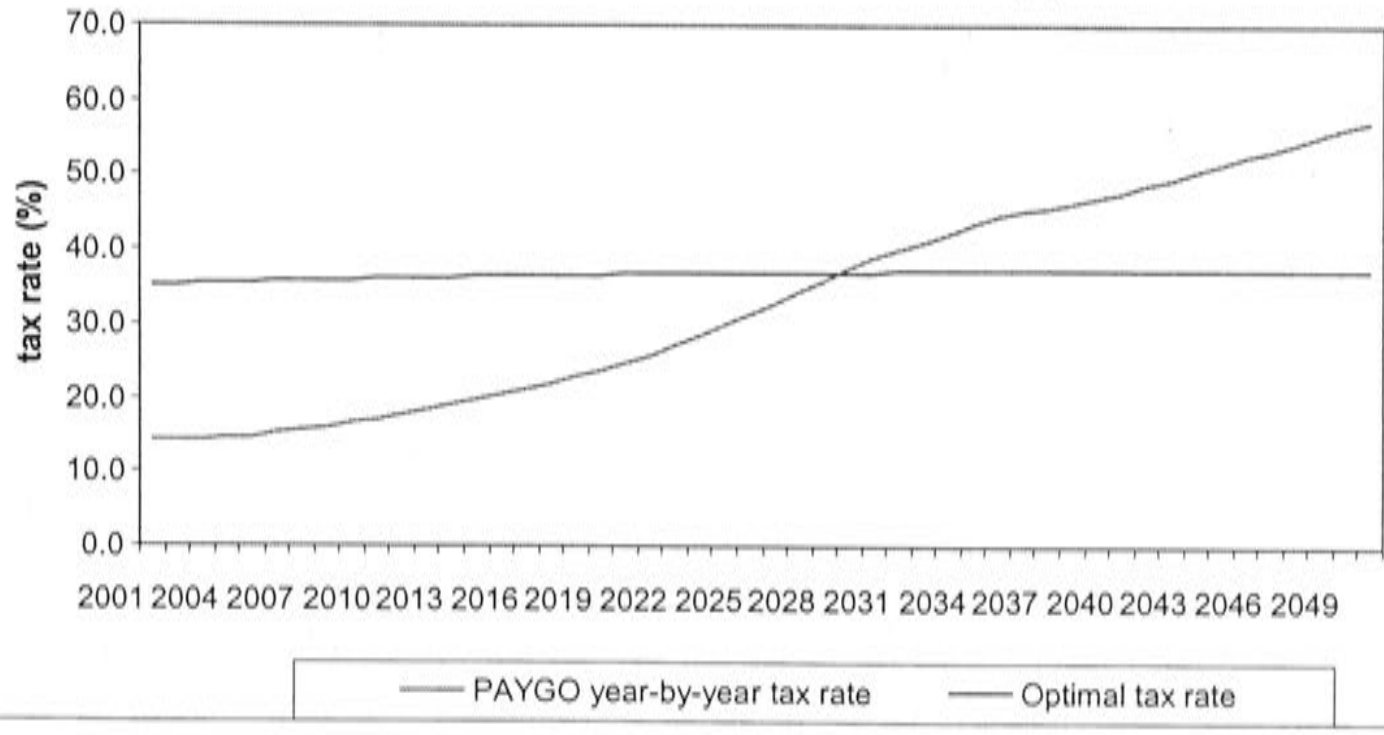
Source: author's simulation results.

Figure 6-17.The Optimal Tax Rate and the PAYGO, Year-by-year Tax Rate when the Inefficient Taxation System Becomes more Efficient (GDP per capita grows at 6%/yr, e=1, inefficiency coefficient declines at 3%/yr)

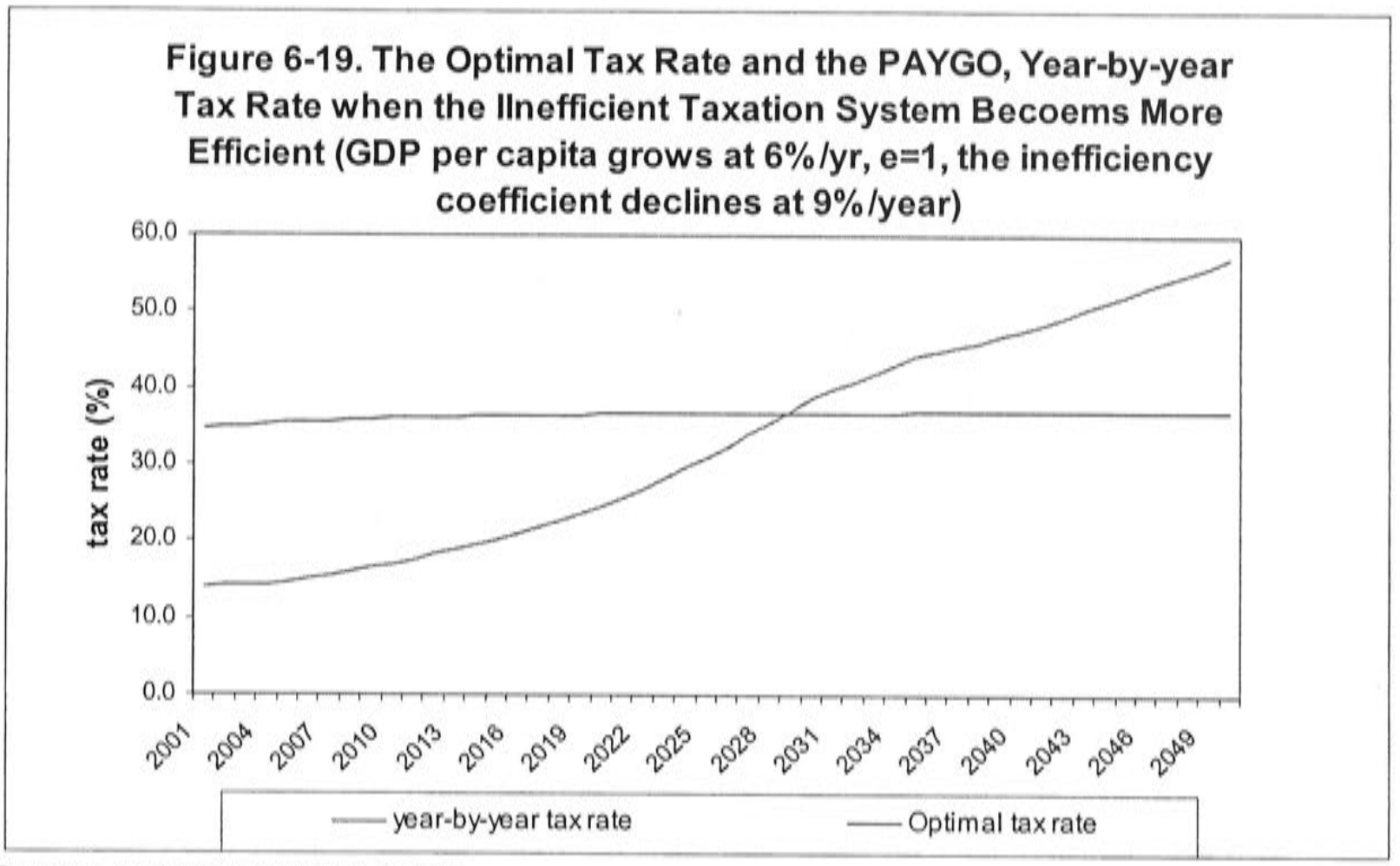


Source: Author's simulation results

Figure 6-18. The Optimal Tax Rate and the PAYGO year-by-year Tax Rate when the Inefficient Taxation System Becomes More Efficient (GDP per capita grows at 6%/yr, e=1, inefficiency coefficient declines at 6%/yr)



Source: Author's simulation results.



Source: Author's simulation results.

Table 6-1. Population Aging between 1950 and 2000 in China (Census results)

Census year	1953	1964	1982	1990	2000
Median age (years)	22.7	20.2	22.9	25.2	N/a
Share of population aged 60 and over (%)	7.3	6.1	7.6	8.6	N/a
Share of population aged 65 and over (%)[a]	4.4	3.6	4.9	5.6	7.0
Share of population aged 14 and less (%)	38.2	41.1	33.4	27.7	22.9
Total dependency ratio A (%) (60+ & 14-/15-59)	76.5	83.8	66.9	54.4	N/a
Total dependency ratio B (%) (65+ & 14-/15-64)[a]	71.7	89.4	62.6	49.9	42.6
Ol-age dependency ratio (%) (60+/15-59)	13.0[1]	11.4[1]	13.0[1]	13.5[2]	N/a

Note: a. These figures are listed for the convenience for comparison with other studies.
Source: 1. figures are from Wu (1991: 29)
2. this figure is for 1987 from Wu (1991: 29),
3. Figures in this column are from SSB (2001b).
All other figures are from Hussain and Zhu (1996).

Table 6-2. Population Aging in China: Some Projection Results

Year	1995	2000	2005	2010	2015	2020	2025	2030	2040	2050	Source
Median age (years)	**27.6**	**30.0**	**32.4**	**34.5**	**35.9**	**37.3**	**38.9**	**40.8**	**43.0**	**43.7**	**UN**
Share of people aged 60 or over (%)	-	10.2	-	11.8	-	15.2	-	20.4	22.1	21.4	Wu, 1991
	9.4	**10.1**	**10.8**	**12.3**	**14.7**	**16.7**	**19.5**	**23.3**	**27.3**	**29.9**	**UN**
	9.6	10.1	10.6	11.7	14.0	15.6	18.2	21.5	-	26.5	The World Bank
Total dependency ratio (%) (60+ & 14-/ 15-59)											Wu, 1991
	55.8	**53.7**	**48.4**	**48.1**	**52.0**	**55.7**	**61.0**	**68.4**	**77.4**	**85.9**	**UN**
	55.9	55.8	50.4	49.4	52.4	56.3	62.2	70.2	-	81.1	The World Bank
Old-age dependency ratio (%) 60+/15-59											Wu, 1991
	14.6	**15.5**	**16.1**	**18.1**	**22.4**	**26.0**	**31.5**	**39.2**	**48.4**	**55.6**	**UN**
	14.9	15.7	15.9	17.5	21.3	24.4	29.5	36.6	-	46.9	The World Bank

Source: Author's calculation/construction based on data from UN (1999), Bos and Vu (et al. 1994), Wu (1991). '-' figures are not available.

Table 6-3. Comparison of the Impact of Population Aging on Pension Schemes

The Scheme	PAYGO	Fully Funded
The balanced finance equation	$t = \frac{N_R}{N_W} * \frac{B_p}{W_R} * \frac{W_R}{W_W}$ (6-3)	$\tau = \frac{B_P}{W_R} * \frac{1}{(1+r)}$ (6-5)
Defined benefits	To keep B_p/W_R, average pension/ average wage of retiree, constant: A higher N_R/N_W requires a higher t (population aging factor) A lower W_R/W_W requires a lower t (growth factor)	To keep B_p/W_R, average pension/ average wage of retiree, constant: Population aging factor has no impact on τ; A lower $1/1+r$ requires a lower τ (growth factor)
Defined contribution	When t, payroll tax rate, is constant: A higher N_R/N_W leads to a lower B_p/W_R (population aging factor) A lower W_R/W_W leads to a higher B_p/W_R (growth factor)	When contribution rate, τ, is constant: Population aging factor has no impact on B_p/W_R; A lower $1/1+r$ leads to a higher B_p/W_R (growth factor)

Table 6-4. The Three Scenarios of Economic Growth[a] Used in the Simulations for Urban China during 2001 and 2050

	Growth rate of employment (%/year)	Growth rate of net wages to workers (%/year)	Growth rate of GDP (%/year)	Growth rate of GDP per capita (%/year)
Case 1[b](high growth)	1.39	6	7.5	6
Case 2 (low growth rate)	1.39	4.5	6.0	4.5
Case 3 (medium growth rate)	1.39	3	4.4	3

Note: a. The growth rates in the table are approximated values. They change slightly when the tax rate changes over time.

Table 6-5. Optimal Tax Rates and Efficiency Gains by Following the Optimal Taxation Path (the base scenario)

	Wage elasticity of labour supply[b]			Growth rate of GDP per capita (%/yr)
	0.1	0.5	1	
Optimal tax rate (%)	37.4	35.5	34.8	6
	34.7	33.7	33.2	4.5
	31.4	30.6	30.3	3
Efficiency gains[a] (%)	*10.2*	*11.6*	*12.3*	*6*
	12.2	*14.6*	*16.1*	*4.5*
	14.0	*16.6*	*18.2*	*3*

Note: a. The efficiency gains (EG) are defined as follows: $EG = 100*[DWL_P-DWL_O/DWL_P]$, where DWL_P is the sum of the present values of deadweight losses following the PAYGO YEAR-BY-YEAR tax rates in each year between 2001 and 2050; and DWL_O is the sum of the present values of deadweight losses of following the optimal taxation path in each year between 2001 and 2050.

b. This is the wage elasticity of labour supply chosen for estimating labour supply curve in 2000.

Source: Author's simulation results.

Table 6-6 Selected Simulation Results for Key Variables of the Base Scenario: the sensitivity test of wage elasticity of labour supply (GDP per capita grows at 6%/year)

Wage elasticity of labour supply		**0.1**	**0.5**	**1**
Optimal tax rate		**37.4**	**35.5**	**34.8**
Employment (million workers)	2001	212.8	208.1	206.3
	2025	296.3	289.9	287.3
	2050	418.4	408.4	405.7
Net wages to workers (thousand yuan)	2001	9.1	9.8	10.1
	2025	36.9	39.6	40.8
	2050	158.0	170.1	175.0
Pre-tax wages (thousand yuan)	2001	12.5	13.3	13.6
	2025	50.6	53.7	55.0
	2050	217.1	230.5	235.9
Tax revenues (million yuan)	2001	723.3	723.3	723.3
	2025	4079.0	4079.0	4079.0
	2050	24721.5	24721.5	24721.5

Source: Author's simulation results

Table 6-7 Selected Simulation Results for Key Variables of the Base Scenario: the impact of growth rate of GDP per capita (wage elasticity of labour supply in 2000=1)

Growth rate of GDP per capita (%/year)		3	4.5	6
Optimal tax rate		**30.3**	**33.2**	**34.8**
Employment (million workers)	2001	205.9	204.2	206.3
	2025	286.7	284.4	287.3
	2050	404.9	401.6	405.7
Net wages to workers (thousand yuan)	2001	9.8	9.8	10.1
	2025	19.8	28.3	40.8
	2050	41.6	84.9	175.0
Pre-tax wages (thousand yuan)	2001	12.7	13.1	13.6
	2025	25.8	37.6	55.0
	2050	54.1	113.1	235.9
Tax revenues (million yuan)	2001	608.1	666.2	723.3
	2025	1721.6	2668.4	4079.0
	2050	5090.2	11324.7	24721.5

Source: Author's simulation results.

Table 6-8 Selected Simulation Results for Key Variables of the Base Scenario: the sensitivity test of wage elasticity of labour supply (GDP per capita grows at 3%/year)

Wage elasticity of labour supply		0.1	0.5	1
Optimal tax rate		**31.4**	**30.6**	**30.3**
Employment (million workers)	2001	213.3	208.3	205.9
	2025	297.0	290.2	286.7
	2050	419.4	409.8	404.9
Net wages to workers (thousand yuan)	2001	9.1	9.5	9.8
	2025	18.4	19.4	19.8
	2050	38.6	40.6	41.6
Pre-tax wages (thousand yuan)	2001	11.9	12.5	12.7
	2025	24.2	25.3	25.8
	2050	50.7	53.0	54.1
Tax revenues (million yuan)	2001	608.1	608.1	608.1
	2025	1721.6	1721.6	1721.6
	2050	5090.2	5090.2	5090.2

Source: Author's simulation results

Table 6-9 Selected Simulation Results for Key Variables of the Base Scenario: the impact of growth rate of GDP per capita (wage elasticity of labour supply in 2000=0.5)

Growth rate of GDP per capita (%/year)		3	4.5	6
Optimal tax rate		**30.6**	**33.7**	**35.5**
Employment (million workers)	2001	208.3	207.1	208.1
	2025	290.2	288.4	289.9
	2050	409.8	407.3	408.4
Net wages to workers (thousand yuan)	2001	9.5	9.6	9.8
	2025	19.4	27.5	39.6
	2050	40.6	82.5	170.1
Pre-tax wages (thousand yuan)	2001	12.5	12.8	13.3
	2025	25.3	36.7	53.7
	2050	53.0	110.4	230.5
Tax revenues (million yuan)	2001	608.1	666.2	723.3
	2025	1721.6	2668.4	4079.0
	2050	5090.2	11324.7	24721.5

Source: Author's simulation results

Table 6-10. Comparison of the Optimal Tax Rate and Efficiency Gains when the Taxation System is Efficient and when it is Inefficient (GDP per capita grows at 6%/year)

	Wage elasticity of labour supply[b]			The taxation system
	0.1	0.5	1	
Optimal tax rate (%)	37.4	35.5	34.8	Efficient
	42.3	40.6	39.9	Inefficient[c]
Efficiency gains[a] (%)	10.2	11.6	12.3	Efficient
	10.4	12.8	14.3	Inefficient

Notes: a and b. See notes for Table 6-5.

c. The inefficiency coefficient of the taxation system is constant and it is 7.5% of total tax revenues.

Sources: Author's simulation results.

Table 6-11. The Impact of the Efficiency of the Taxation System on the PAYGO year-by-year and Optimal Tax Rate and the Efficiency Gains of Following the Optimal Tax Rate
(GDP grows at 6%/yr, wage elasticity of labour supply=1)

The taxation system		Inefficient taxation system (inefficiency coefficient = 7.5%)	The declining rate of the inefficiency coefficient (%/year)			Efficient taxation system
			3	6	9	
Efficiency gains[a] (%)		14.3	12.2	12.2	12.5	12.3
PAYGO year-by-year tax rate (%)	Year					
	2001	14.2	14.2	14.1	14.1	13.1
	2010	17.9	17.5	17.2	17.0	16.4
	2020	26.3	25.2	24.7	24.4	23.6
	2030	42.6	40.1	39.1	28.8	37.0
	2040	52.6	48.8	47.7	47.4	44.7
	2050	63.8	58.3	57.3	57.0	52.9
Optimal tax rate (%)	Year					
	2001	39.9	36.3	35.1	34.7	34.8
	2010	39.9	36.9	36.1	36.0	34.8
	2020	39.9	37.4	36.8	36.6	34.8
	20230	39.9	37.8	37.1	36.8	34.8
	2040	39.9	38.0	37.3	36.9	34.8
	2050	39.9	38.2	37.4	36.9	34.8

Note: a. see notes following Table 6-5.
Source: Author's simulation results.

6-12. The Impact of the Speed of Population Aging on the PAYGO year-by-year and the Optimal Tax Rate as well as on Efficiency Gains (GDP per capita grows at 6%/year, wage elasticity of labour supply=1, α=7.5% in 2000, the decreasing rate of α is 6%/yr)

Scenario		Base	Faster population aging in cities (10% higher than the base case)	Slower population aging in cities 10% lower than the base case)
Efficiency gains (%)		12.2	12.9	11.6
PAYGO year-by-year tax rate (%)	Year			
	2001	14.1	15.7	12.6
	2010	17.2	19.1	15.3
	2020	24.7	27.6	21.8
	2030	39.1	44.2	34.3
	2040	47.7	54.4	41.5
	2050	57.3	65.8	49.5
Optimal Tax rate (%)	Year			
	2001	35.1	39.7	30.8
	2010	36.1	40.8	31.7
	2020	36.8	41.5	32.3
	2030	37.1	41.9	32.6
	2040	37.3	42.1	32.7
	2050	37.4	42.2	32.8

Source: author's simulation results.

Appendix 6.1 Barro's (1979) Optimal Public Debt Model and Barro's Assumption to have a Constant Optimal Tax Rate

This Appendix briefly explains Barro's (1979) optimal public debt model and then examines Barro's key assumptions that lead to his result—a time invariant optimal tax rate.

A6.1.1 Barro's (1979) Model

In Barro's (1979) optimal public debt model, the government is assumed to have only two methods of financing public expenditures: collecting taxes and issuing bonds. Real government expenditure for period t is denoted by G_t, which does not include interest payments on public debt, and is assumed to be exogenously given. The real tax revenue collected by the government in each period t is denoted by τ_t; and aggregate real income, which is also exogenously given, is denoted as Y_t. The real stock of public debt outstanding at the end of period t is denoted as g_t[1], which is assumed to take the form of one-period, single-coupon bonds that are issued at par. It is also assumed that the price level is constant and is expected to be so; and the real and nominal rate of return on public and private debt, r, is constant too.

The government faces the following overall budget constraint,

$$\sum_{t=1}^{\infty}[G_t/(1+r)^t]+g_0=\sum_{t=1}^{\infty}[\tau_t/(1+r)^t] \qquad \text{(A6.1-1)}$$

This equation holds with the condition that rules out perpetual debt financing (excluding interest payments).

Barro assumes that taxation involves some collection costs and/or indirect misallocation costs that are imposed on the private economy. The latter are the so-called 'deadweight loss' or 'excess burdens' of taxation. For a given present value of taxation, shown by the left hand side of equation (A6.1-1) (excluding interest payments), the costs of imposing

[1] The real stock of public debt outstanding at the beginning of the government-planning period is denoted as g_0 in equation (A6.1-1).

taxes are assumed to depend upon the distribution of taxes by type and timing. This model focuses on the timing of taxes only.

The real per period costs of taxation, denoted as Z_t, is assumed to depend positively, with a positive second derivative, on the total net tax collected during period t, τ_t, and negatively on the contemporaneous real income, Y_t, but not on the values of taxes or incomes in other periods. Further, it is assumed that the cost function is homogeneous and can be written as follows,

$$Z_t = F(\tau_t, Y_t) = \tau_t f(\tau_t / Y_t) \qquad \text{(A6.1-2)}$$

where $f' > 0$, and the function f is assumed to be invariant over time. The present value of taxation costs is then given by,

$$Z = \sum_{t=1}^{\infty} \frac{\tau_t f(\tau_t / Y_t)}{(1+r)^t} \qquad \text{(A6.1-3)}$$

The government's objective is to minimize the taxation costs, Z, at the present time (date 1), given the net present value of tax revenues specified in equation (A6.1-1). In other words, the government needs to choose τ_1, τ_2, τ_3 ..., to minimize Z, subject to the overall budget constraint of equation (A6.1-1).

Following the usual optimisation procedure, the Lagrange function is set as in equation (A6.1-4):

$$\ell = \sum_{t=1}^{\infty} \frac{\tau_t f(\tau_t / Y_t)}{(1+r)^t} + \lambda[R - \sum \frac{\tau_t}{(1+r)^t}] \qquad \text{(A6.1-4)}$$

where R is the present value of all government liabilities, which equals to the left-hand side of equation (A6.1-1).

The general formula of the first-order condition for the solution of equation (A6.1-4) is given by:

$$\frac{\partial \ell}{\partial \tau_t} = \frac{f(\tau_t/Y_t)}{(1+r)^t} + \frac{\tau_t}{Y_t}\cdot\frac{f'(\tau_t/Y_t)}{(1+r)^t} - \frac{\lambda}{(1+r)^t} = 0 \qquad \text{for all t} \tag{A6.1-5}$$

From equation (A6.1-5), the optimal τ_t/Y_t is solved as follows:

$$\tau_t/Y_t = \frac{\lambda - f(\tau_t/Y_t)}{f'(\tau_t/Y_t)} \quad \text{for all t} \tag{A6.1-6}$$

The solution as expressed in equation (A6.1-7) shows that in this economy, the optimal taxation rule must be such that the ratio τ_t/Y_t in each period is given by equation (A6.1-6), and it is the same equation for all t. Denote $\tau_t/Y_t = \theta$, then according to equation (A6.1-6),

$$\theta = \frac{\lambda - f(\theta)}{f'(\theta)} \tag{A6.1-7}$$

This shows that the optimal timing of taxation requires that θ is equal in all periods.

Following this optimal condition, the tax revenue in each period is then determined from the given values of Y, G, r and b_0. These values of taxes in turn imply values of government deficit for each period, which has to be financed by debt issue.

A6.1.2 Examine Barro's Assumptions for the Time Invariant Optimal Tax Rate

The result of Barro's (1979) model indicates that when certain assumptions are satisfied, the optimal tax rate is time invariant. This section examines this result and the key assumption that leads to this result.

Define the following variables for period t:

Y_t is a kind of "economic scale' parameter, which is exogenous in Barro's model. For instance, population is one of these scale shifters.

ϕ_t is a vector of shift parameters that are exogenously given. For example, the ratio of net to gross tax revenues would be part of ϕ_t and changes of this ratio would make ϕ_t time dependent.

B_t is the tax base, which is endogenous;

Z_t is the taxation costs, or the deadweight losses in our applications;

π_t is the tax rate;

$b_t = B_t/Y_t$ is the tax base for an economy of 'unit' size.

$z_t = Z_t/Y_t$ is the taxation costs for an economy of 'unit 'size.

For example, in our application for the Chinese case, Y_t would be thought of as population/workers and b_t as labour earnings per person/worker, so that B_t becomes total labour earnings.

Following Barro's notation, τ_t is the tax revenue. By definition:

$$\tau_t = B_t \pi_t \qquad \text{(A6.1-8)}$$

Again by definition:

$$B_t = Y_t b_t(\pi_t, \phi_t) \qquad \text{(A6.1-9)}$$

$$Z_t = Y_t z_t(\pi_t, \phi_t) \qquad \text{(A6.1-10)}$$

With these definitions, the government problem in the Barro's (1979) model is as follows:

$$Min \sum_{t=1}^{T} \frac{Z_t}{(1+r)^t} \qquad \text{(A6.1-11)}$$

subject to the budget constraint:

$$\sum_{t=1}^{T}\frac{\tau_t}{(1+r)^t}=g_0+\sum_{t=1}^{T}\frac{G_t}{(1+r)^t} \qquad \text{(A6.1-12)}$$

where G_t is the real government expenditure in period t, r is the discount rate. Here the government-planning horizon is assumed to be finite between period 1 and T. The other assumptions are the same as the Barro's (1979) model discussed in A6.1.1.

Again, the standard Lagrange method is applied to solve this optimisation problem. The solution is in equation (A6.1-13):

$$\pi_t=\frac{\partial z_t/\partial \pi_t-b_t}{\partial b_t/\partial \pi_t} \qquad \text{for all t} \qquad \text{(A6.1-13)}$$

Since b_t and z_t are functions of π_t and ϕ_t only, when ϕ_t is constant, the solution for the optimal tax rate is the same for all t. So in this economy, as long as the shift parameters are time independent, the optimal tax rate is constant.

From equation (A6.1-8) and (A6.1-9), we have:

$$\frac{\tau_t}{Y_t}=\frac{\pi_t Y_t b_t(\pi_t,\phi_t)}{Y_t}=\pi_t b_t(\pi_t,\phi_t)=\theta_t(\pi_t) \qquad \text{(A6.1-14)}$$

where θ_t is a function of the tax rate π_t only, when ϕ_t is constant. So this equation indicates that in Barro's (1979) model, when τ_t/Y_t is a constant, the tax rate, π_t, must also be a constant.

Now examine the key assumption of Barro's (1979) model. We have:

$$\frac{Z_t}{\tau_t}=\frac{Y_t z_t(\pi_t,\phi_t)}{Y_t b_t(\pi_t,\phi_t)\pi_t}=\frac{z_t(\pi_t,\phi_t)}{\theta_t(\pi_t)} \qquad \text{(A6.1-15)}$$

Barro's assumption of the cost function (A6.1-2) can be written as follows:

$$\frac{Z_t}{\tau_t} = f(\tau_t / Y_t) \qquad \text{(A6.1-16)}$$

This can be interpreted as an assumption that the ratio of the taxation cost to the tax revenue is only a function of τ_t/Y_t, or θ_t. Based on (A6.1-15), this is true if ϕ is constant.

So in Barro's (1979) model, the key assumption for a constant optimal tax rate over time is his cost function. In other words, when Z_t/τ_t is constant, τ_t/Y_t, or θ_t is a constant. However, based on equation (A6.1-15), Z_t/τ_t is a constant when ϕ_t is fixed.

Appendix 6.2 The Government Optimal Taxation Model for Pension Liabilities and Its Solutions

In this Appendix, our basic model, which can be regarded as an application of Barro's (1979) framework, is set up. This model explicitly uses labour demand and supply curves to demonstrate the economy. It uses payroll tax to collect taxation revenues and the deadweight losses (DWL) as the taxation costs. Obviously, the DWL is a function of the tax rate as well as parameters of the labour demand and supply curves. The setting of the model allows explicit growth of employment, wages and GDP, etc. This Appendix firstly sets up the model. It then gives the solutions of the basic model and adds in the economic transition factor—the inefficiency coefficient[2] of the taxation system—into the model. Finally the conditions to satisfy Barro's key assumption for a time invariant optimal tax rate in the basic model are examined, and the solutions with these conditions hold are discussed.

A6.2.1 The Model

Suppose in a transitional economy where the population is aging, so that the public pension liabilities needed to be financed by the government rise over time. The government collects all revenues from one type of tax—payroll tax. It can also borrow by issuing bonds to finance its expenditures[3]. The government's problem is to choose the optimal taxation path, such that the associated deadweight losses to finance its expenditures are minimized.

For the conveniences of the modelling exercise, we need a production function that gives a linear labour demand function, when (real) wages are set to be equal to the marginal product of labour. In the production function, the Hick-Neutral technical change is chosen, since this is an aggregate production function for the urban economy. The labour supply function that suits the purpose of the simulation is also a linear function. As explained in Appendix 6.3, the values of individual parameters of these

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[2] As explained in the main text, the inefficiency coefficient indicates the % of tax revenue that is wasted. As a result, only (1-inefficiency coefficient) of tax revenue is used to pay public pension liabilities.
[3] We focus on the public pension liabilities here, but the model can be used for the optimal time path to finance general government expenditures.

functions are not important and will not be calibrated. Instead, only the slope and the intercept of the linear supply and demand function are calibrated.

The production function is assumed as follows[4]:

$$Y_t = A_t(L_t - \frac{1}{2}\frac{a_0}{K_t}L_t^2) \qquad \text{(A6.2-1)}$$

where Y_t is output, L_t is employment, K_t is capital stock, and A_t is the total factor productivity (TFP) of the economy, all in period t; a_0 is a positive coefficient. This economy has constant returns to scale. The growth of the economy depends on the growth of factor inputs—labor, capital, and technology—the TFP.

Assuming profit maximisation behaviour of firms, the labour demand function can be derived from the production function by setting wages equal to the marginal product of labour:

$$w_t^d = A_t(1 - \frac{a_0}{K_t}L_t) \qquad \text{(A6.2-2)}$$

where w_t^d is labour demand price—the wage rate paid by employers.

Supply of labor is assumed to be given by the following function:

$$L_t = P_t(1 + c_t w_t^s) \qquad \text{(A6.2-3)}$$

where L_t is labor supply, P_t can be regarded as a parameter to captures the population/labour force factor, w_t^s is labour supply price—the wage rate perceived by workers[5], and c_t is a factor that captures the elasticity of labour supply. All variables are in period t.

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[4] Here 'L' is used to refer labor, which corresponds to payroll tax that is usually collected for pension payments. In general, L can be regarded as the taxable factor in the economy, and the tax as a general tax on the private economy.

[5] This wage rate is discussed more in Section 6.5.1.

The setting up of the basic model ensures an analytical solution for the deadweight loss (DWL) of taxation. As shown in Figure 6-10 in the main text, the objective function of the government is given by equation (6-6) in the main text, which is reproduced as equation (A6.2-4) here:

$$DWL = \sum_{t=1}^{T} \frac{DWL_t}{(1+r)^t} \qquad \text{(A6.2-4)}$$

As explained in the main text, when a payroll tax (π)——expressed as a ratio (%) of the net wages to workers (W^s)—is collected, it drives a wedge between wages paid by employers, $W^s(1+\pi)=W^d$, and those received by employees, W^s. The DWL is represented by the usual triangle in Figure 6-10.

The government's objective is to choose π_t for each period so as to raise a given amount of revenues (in terms of its present values), denoted as τ_t, such that the present value of the deadweight loss, as expressed in equation (A6.2-4), associated with the payroll tax is minimized,

where DWL_t is the deadweight loss of taxation in period t, r is the discount rate. T represents the last year of the planning horizon of the government.

The choice of the tax rate must satisfy the following budget constraint to finance government's expenditures, which are its pension liabilities in our case. That is, the present value of taxation revenues in each period, τ_t, must be equal to that of government (pension) expenditures in each period, B_t, which is assumed to be exogenously given,

$$\sum_{t=1}^{T} \frac{B_t}{(1+r)^t} = \sum_{t=1}^{T} \frac{\tau_t}{(1+r)^t} \qquad \text{(A6.2-5)}$$

A6.2.2 the Solutions of the Model

The usual optimisation solution requires that the following condition hold for each period between 0 and T,

$$\frac{\partial D_t}{\partial \pi_t} = \lambda \frac{\partial \tau_t}{\partial \pi_t} \tag{A6.2-6}$$

where λ is the ratio of the marginal deadweight losses of the payroll tax to the marginal revenue of the payroll tax. It is a constant at the optimum.

D_t and R_t, are functions of the tax rate, π_t. For any given tax rate at period t, π_t, D_t is simply the area of the triangle as shown in Figure 6-10,

$$D_t = \frac{1}{2} W_t^s \pi_t (L^* - L_t) \tag{A6.2-7}$$

where W_t^s, L_t and L^* are solved as follows,

$$W_t^s = \frac{A_t[1-(a_0/K_t)P_t]}{A_t c_t P_t (a_0/K_t)+(1+\pi_t)}, L_t = \frac{A_t c_t P_t + P_t(1+\pi_t)}{A_t c_t P_t (a_0/K_t)+(1+\pi_t)}, L^* = \frac{A_t c_t P_t + P_t}{A_t c_t P_t (a_0/K_t)+1} \tag{A6.2-8}$$

Substitute these solutions into equation (A6.2-7) to get equation (A6.2-9):

$$D_t = \frac{1}{2}\pi_t^2 \frac{A_t^2 c_t P_t [1-P_t(a_0/K_t)]^2}{[A_t(a_0/K_t)c_t P_t + 1][A_t c_t P_t (a_0/K_t)+(1+\pi_t)]^2} \tag{A6.2-9}$$

For period t, given payroll tax rate, π_t, the tax revenue, τ_t, is calculated as follows:

$$\tau_t = \frac{A_t \pi_t [1-(a_0/K_t)P_t][A_t c_t P_t + P_t(1+\pi_t)]}{[A_t c_t P_t (a_0/K_t)+(1+\pi_t)]^2} \tag{A6.2-10}$$

Using the above equations, applying the standard Lagrange approach, the solution for the government optimisation problem is shown in equation (A6.2-11):

$$\pi_t = \frac{\lambda[A_t c_t P_t(a_0/K_t)+1](1+A_t c_t)}{A_t c_t[1-P_t(a_0/K_t)]-\lambda[2A_t c_t P_t(a_0/K_t)+1-A_t c_t]} \qquad \text{(A6.2-11)}$$

This result shows that the optimal payroll tax rate in period t, π_t, is a function of the parameters of the labor supply and demand curves as well as λ.

Now, it should be quite straightforward to add in the economic transition factor, the inefficiency coefficient, as discussed in the main text, into this model. Suppose a proportion, $0 < \alpha_t < 1$, of the taxation revenues are wasted in the sense it can not be used to pay pension liabilities, the revenue function of taxation, (A6.2-1), becomes:

$$\tau_t = (1-\alpha_t)\frac{A_t\pi_t[1-(a_0/K_t)P_t][A_t c_t P_t + P_t(1+\pi_t)]}{[A_t c_t P_t(a_0/K_t)+(1+\pi_t)]^2} \qquad \text{(A6.2-12)}$$

The optimal solution for the tax rate, accordingly becomes equation (A6.2-13):

$$\pi_t = \frac{(\lambda/1-\alpha_t)[A_t c_t P_t(a_0/K_t)+1](1+A_t c_t)}{A_t c_t[1-P_t(a_0/K_t)]-(\lambda/1-\alpha_t)[2A_t c_t P_t(a_0/K_t)+1-A_t c_t]} \qquad \text{(A6.2-13)}$$

In particular, equation (A6.2-13) shows that there is a negative relationship between the optimal tax rate, π_t, and the inefficiency coefficient, α_t, which is shown in equation (A6.2-14):

$$\frac{d\pi_t}{d\alpha_t} = \frac{-\lambda[A_t c_t P_t(a_0/K_t)+1](1+A_t c_t)[A_t c_t(1-P_t(a_0/K_t)]}{\{A_t c_t[1-P_t(a_0/K_t)]-(1-\alpha_t)\lambda[2A_t c_t P_t(a_t/K_t)+1-A_t c_t]\}^2} < 0 \qquad \text{(A6.2-14)}$$

The derivative is negative, since all parameters (including λ) are positive by definition, and $1 - P_t(a_0/K_t) > 0$ is the condition for a positive equilibrium wage rate (see equation A6.2-8).

In our simulations, the inefficiency coefficient, α_t, is assumed to be exogenously given, and declines over time. This represents the expectation that the taxation system becomes more efficient during economic transition: a declining amount of each yuan of tax revenue collected is used to finance the administrative costs. As a result, equation (A6.2-13) suggests that, for the transition economy, if the optimal payroll tax rate to finance government pension expenditures when $\alpha_t = 0$ is constant, then it rises with time when α_t declines over time.

A6.2.3 Examining the Conditions for Barro's (1979) Assumption and the Solution of the Model when These Conditions Hold

For the conveniens of exposition, the linear labour demand and supply curves in the model are written in the simple forms of the follows:

$$L = a + bW^s \tag{A6.2-15}$$

$$L = c - dW^d \tag{A6.2-16}$$

where L is employment, W^s is the wage perceived by the workers, or the net wages. W^d is the wage paid by the employers, or the pre-tax wages. It is the marginal product of labour. By definition,

$$W^d = W^s(1+\pi) \tag{A6.2-17}$$

a, b, c, and d are parameters, where $b > 0$, $d > 0$. It is assumed that $c > a$, so that a positive equilibrium wage can be achieved. All variables become time-dependent when they are treated in the intertemporal context.

Following the same procedure in Section A6.2.2, the main variables are solved as follows:

$$L = \frac{bc + ad(1+\pi)}{b + d(1+\pi)} \tag{A6.2-18}$$

$$W^s = \frac{c - a}{b + d(1+\pi)} \tag{A6.2-19}$$

$$W^d = \frac{(c-a)(1+\pi)}{b + d(1+\pi)} \tag{A6.2-20}$$

$$D = \frac{1}{2}\pi^2 \frac{bd(c-a)^2}{(b+d)[b + d(1+\pi)]^2} \tag{A6.2-21}$$

$$\tau = \frac{\pi(c-a)[bc + ad(1+\pi)}{[b + d(1+\pi)]^2} \tag{A6.2-22}$$

where the variables are as defined in Section A6.2.2.

Following the standard Lagrange function to minimise the total deadweight loss over the period between 0 and T, the optimal tax rate is expressed in equation (A6.2-23), which is equivalent to equation (A6.2-11) in Section A6.2.2:

$$\pi_t = \frac{\lambda(b_t + d_t)(a_t d_t + b_t c_t)}{b_t d_t (c_t - a_t) - \lambda(2a_t b_t d_t + a_t d_t^2 - b_t c_t d_t)} \tag{A6.2-23}$$

It can be shown that, when the changes of the parameters over time is neutralised, Barro's key assumption for a constant optimal tax rate, π_t, is satisfied in this model, and the optimal tax rate expressed in equation (A6.2-23) is time invariant.

As discussed in Section A6.1.2, Barro's (1979) key assumption is that the ratio of taxation losses to tax revenues is constant. In our model, this is the case when the following two conditions hold:

Condition 1. The slopes of the labour demand and supply curves change at the same and a constant rate per period (year);

Condition 2. The intercepts of the labour demand and supply curves change at the same and a constant rate per period (year).

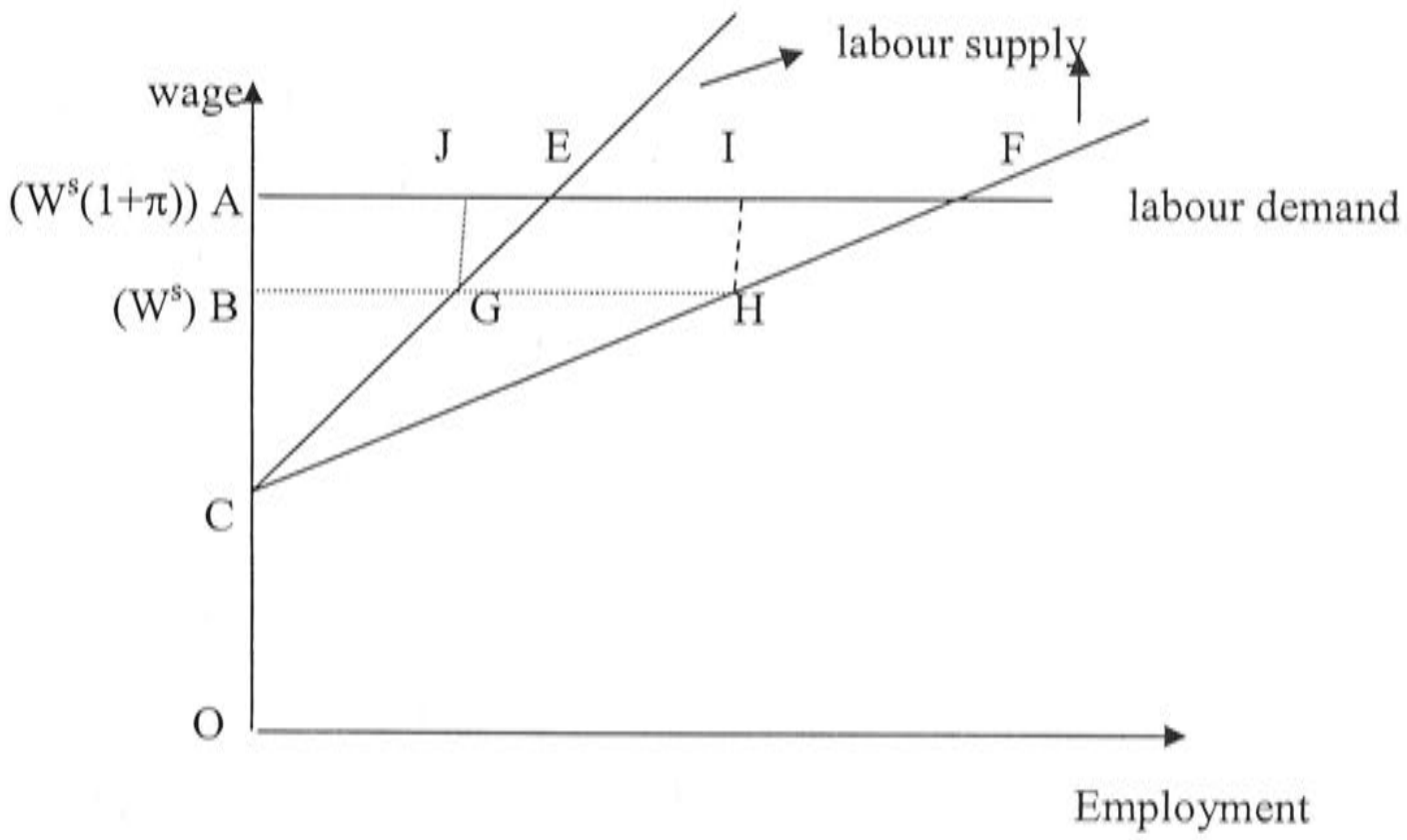
The proof is provided by a simply geometric analysis as follows. First, consider the special case in Figure A6.2-1, where labour demand is fully elastic and is represented by the horizontal labour demand curve, AJEF. Labour supply curve is upward sloping, represented by the curve CGE. Assume the intercept of the labour supply curve is fixed at C, but allow the slope of the curve to change. For example, in the diagram, the labour supply can rotate around point C from CGE to a new curve, CHF.

Suppose in period 1, labour supply curve is CGE. The equilibrium wage rate is at A. Suppose a payroll tax of AB is imposed on each employee, and the new equilibrium is at G. The distance OB is the supply wage, W^s, in the model. The distance OA is the demand wage, $W^s(1+\pi)$, in the model. The deadweight losses (DWL) are represented by the triangle JEG, and the tax revenue (τ) is the rectangular ABGJ. Therefore,

$$\frac{DWL}{\tau} = \frac{1}{2}\frac{JE * JG}{AJ * JG} = \frac{1}{2}\frac{JE}{AJ} = \frac{1}{2}\frac{JE}{BG} = \frac{1}{2}\frac{JG}{BC} = \frac{1}{2}\frac{AB}{BC} \qquad \text{(A6.2-24)}$$

where DWL and τ is deadweight losses and tax revenues, respectively, as defined previously in the model.

Figure A.6.2-1. Sufficient Conditions for a Constant Intertemporal Tax Rate



Obviously, in this special case, rotating the labour supply curve has no impact on the ratio of DWL/τ, as long as the tax rate is constant. In this case, since labour demand is fully elastic, the demand wages are constant at OA. Therefore, a constant tax rate leads to a constant distance between the supply wages (OB) and the demand wages (OA), that is, the distance AB is constant. Suppose the supply curve rotates to CHF, the ratio of the deadweight losses and taxation revenues, denoted as DWL'/τ', is represented by equation (A6.2-25)

$$\frac{DWL'}{\tau'} = \frac{1}{2}\frac{IF * IH}{BH * IH} = \frac{1}{2}\frac{IF}{BH} = \frac{1}{2}\frac{IH}{BC} = \frac{1}{2}\frac{AB}{BC} \qquad \text{(A6.2-25)}$$

So in the special case shown in Figure A6.2-1, a constant payroll tax rate leads to a constant ratio of the deadweight losses to the taxation revenues, and *vice versa*. Following the same approach, it can be easily proved that this relationship holds for the case when the supply curve is fully elastic, but the demand curve can rotates around its intercept on the vertical axis.

In general, when these two special cases are combined together, it is straightforward to see that there is the same relationship between the payroll tax rate and the ratio of deadweight losses and tax revenues, even when both the labour supply and labour demand are elastic, and are allowed to rotate around their intercepts on the vertical axis. This is true so long as the rotation of the two curves makes sure that the equilibrium wage without payroll tax is constant.

In fact, even the last condition can be relaxed. Changes of equilibrium wages due to the shift of intercepts on the vertical axis do not affect the relationship expressed in equations (A6.2-24) and (A6.2-25), if both intercepts shift in the same direction and by the same proportion. Such a proportional shift can be regarded as if the horizontal axis in Figure A6.2-1 shifts down (or up), leaving the proportion AB/BC unchanged. As a result, equations (A6.2-24) and (A6.2-25) still hold.

This exercise shows that in fact, Barro's (1979) assumption—a constant ratio of taxation costs to taxation revenues—allows for some flexible cases. In our model, as long as

conditions 1 and 2 listed previously, with regard to the changes of the parameters in labour supply and demand curves, are satisfied, Barro's (1979) assumption is satisfied.

Now, it should be quite easy to prove when conditions 1 and 2 hold, the optimal solution to our basic model is a constant tax rate over time. Assume that parameters a and c grow at the same and a constant rate, say, g/year; and that b and d grow at the same and a constant rate, say, h/year; and g>h. As a result, in the discreet time case, $a_t = a_0(1+g)^t$, $b_t = b_0(1+h)^t, c_t = c_0(1+g)^t, d_t = d_0(1+h)^t$, where a_0, b_0, c_0, d_0 are initial values of the parameters in period 0. Substituting these parameters into the solution for the optimal tax rate as expressed in equation (A6.2-23), the optimal tax rate is not affected by the time index and only depends on the initial values of the parameters and the Lagrange multiplier:

$$\pi_t = \frac{\lambda(b_0 + d_0)(a_0 d_0 + b_0 c_0)}{b_0 d_0 (c_0 - a_0) - \lambda(2a_0 b_0 d_0 + a_0 d_0^2 - b_0 c_0 d_0)} \qquad \text{(A6.2-26)}$$

By the way, with conditions 1 and 2 expressed in this way, the growth rate of wages and employment can be solved based on equations (A6.2-18) and (A6.2-19):

$$L_t = \frac{b_0 c_0 + a_0 d_0 (1+\pi_t)}{b_0 + d_0 (1+\pi_t)} (1+g)^t \qquad \text{(A6.2-27)}$$

$$W_t^s = \frac{c_0 - a_0}{b_0 + d_0 (1+\pi_t)} \frac{(1+g)^t}{(1+h)^t} \qquad \text{(A6.2-28)}$$

Based on these two equations, the growth rate of employment and that of net wages are constant, when the tax rate is constant:

$$\frac{L_{t+1} - L_t}{L_t} = g \qquad \text{(A6.2-29)}$$

$$\frac{W_{t+1}^s - W_t^s}{W_t^s} = \frac{1+g}{1+h} - 1 \qquad \text{(A6.2-30)}$$

When the tax rate does not change over time, the employment grows at g/year, while the net wages to workers grow at $g - h/1+h$ per year, or approximately, g-h/year when h is small.

Similarly, it is straightforward to show that with the growth rates of a, b, c, d are assumed as above, the growth rate of GDP is at $\frac{(1+g)^2}{1+h} - 1$ per year when the tax rate is constant. GDP per capita (or per worker) is the same as that of the growth rate of net wages at $g - h/1+h$ per year.

Appendix 6.3 Estimation of Parameters for the Base Year and Some Details of the Simulation Methods

This Appendix provides the procedure of how the parameters for the base year, 2000, are calibrated from the figures of the urban Chinese economy. It also explains some details of the simulation methods, as supplementary materials to the main text.

A6.3.1. The Economy in the Base Year

Since the current pension scheme only covers city residents with urban household registration. The simulation focuses on the urban economy. Although the rural-urban segregation in China still exists as a result of policies such as the household registration system, rural-urban migration has becoming an increasingly important phenomenon (Section 5.5.2). However, the simulations assume that the rural-urban segregation will exist in the 2001-2050 period; at least the public pension scheme will not extend to cover residents without the urban household registration.

The urban economy in the base year—2000 is shown in Figure A6.3-1, which is very similar to Figure 6-10. In the diagram, L is urban employment, W^s is the wage perceived by employees. It is the supply wage, or the net wage; W^s includes wages that are regarded as delayed payments for labour, such as employer contributions to workers' individual accounts for future pensions. Since income tax is very little in China, it is ignored in the simulations. W^s is the actual wage rate that determines labour supply. W^d is the wage paid by employers, or the pre-tax wage. It is the marginal product of labour. W^d includes any employer contribution to pensions, as well as indirect taxes that firms have to pay; The labour supply and demand curves are as expressed in equations (A6.2-15) and (A6.2-16), where $b>0$, $d>0$. It is assumed that $c>a$, so that a positive equilibrium wage can be achieved.

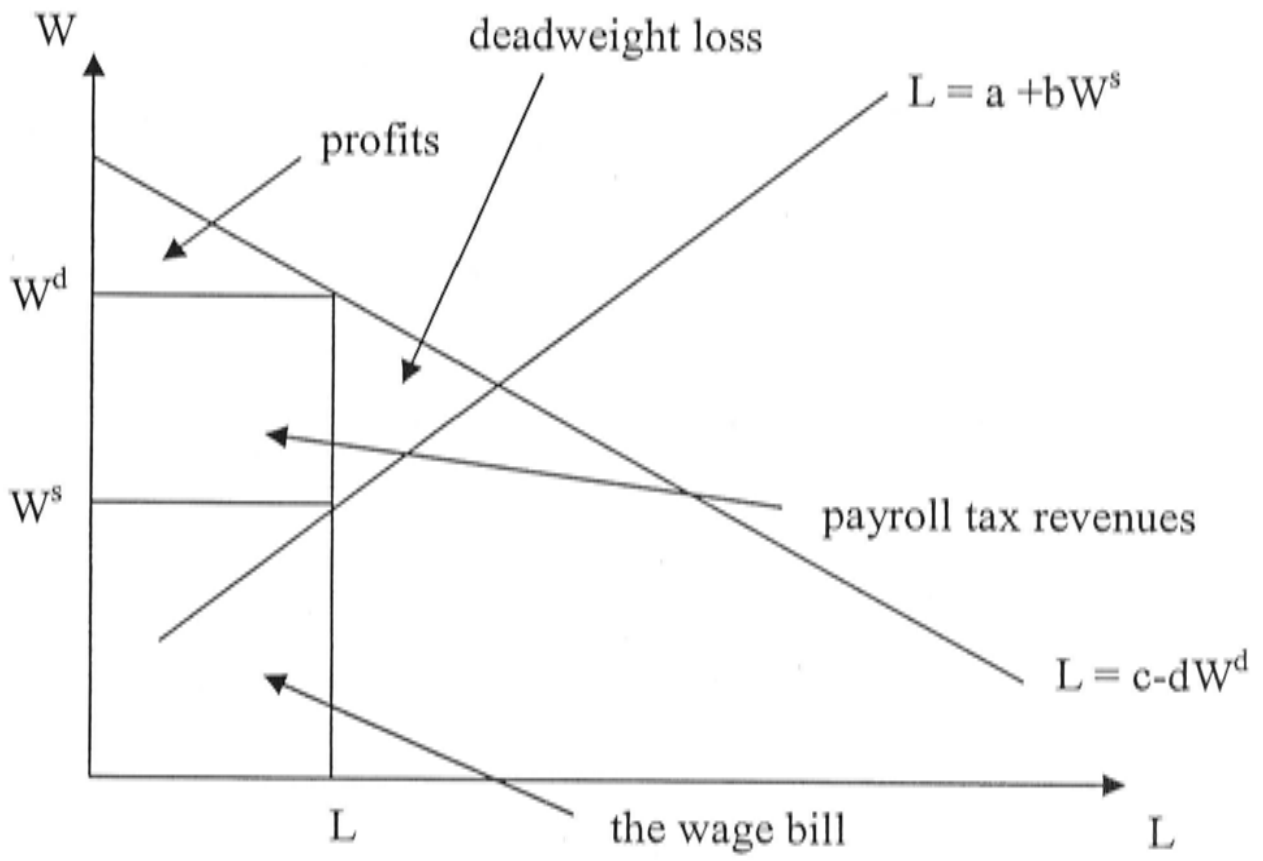
In this diagram, urban GDP is decomposed into three parts: profits, the wage bill and the payroll tax revenues. It is based on the figures of these variables that the calibration is conducted. Firstly urban GDP is estimated based on national GDP and contributions by the agricultural sector and TVEs[6] in villages:

[6] Figures for TVEs are from The Editorial Committee (2001).

Urban GDP = National GDP - GDP by the agricultural sector - GDP by the TVEs.

Where the TVEs are the township and village enterprises, which mainly engage in activities in industrial and the service sectors. The result shows that the urban GDP in 2000 was about 4803.6 billion yuan.

Figure A6.3-1. The Estimation of China's Urban Economy in 2000



The wage bill is estimated as follows. According to the official statistics, the annual average wages received by urban employees in 2000 was 9.371 thousand yuan (2000 value) per employee. This was the wage rate paid to employees before the income tax and employee contributions to pensions were deducted. Since the employers contributed another 6%[7] of wage bill into employees' individual accounts in the public pension scheme, W^s in 2000 is estimated to be 9.93 thousand yuan/employee. The official figures for urban employment was 212.74 million[8] people, including self-employed and workers in private firms. For simplicity, suppose the urban average wages applied to all urban workers, including self-employed people, the wage bill is estimated to be 2112.7 billion yuan[9]. It accounts for about 44 per cent of urban GDP in 2000.

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[7] See Chapter 4 for more details of the public pension scheme in China in 2000.
[8] The official employment figure does not appear to include rural migrants. Figures in this section are for 2000, from SSB (2001), unless otherwise stated.
[9] The average wages used here are for those employed by registered work units, and are likely to be higher than wages of those self-employed and worker in private firms, which accounted for about 50% of urban employment. . The employment figure is likely to exclude rural migrants. These two forces balanced out to certain extent. So the wage bill should be approximately in the right magnitude.

The payroll tax revenues in 2000 are assumed to be the sum of actual pensions paid and the 'waste ' of the taxation system due to its inefficiency. As discussed in Section 6.4 in the text, this coefficient is the % of tax revenue that is wasted so that only (1-inefficiency coefficient) of gross tax revenues can be used to pay public pension liabilities. It is difficult to find a satisfactory measure of this coefficient. In the simulations, the share of wages to employees in all government agencies[10] in total government expenditures is used as an approximation for this coefficient in 2000. It is estimated to be about 7.5%[11]. The total value of the government payroll tax revenues (including the 'waste') is therefore estimated as 295.5 billion yuan. It accounts for about 6.2 per cent of urban GDP.

Profits in Figure A6.3-1 can now be calculated as the difference between urban GDP and the sum of government tax revenues and the wage bill. It is about 2395.3 billion yuan, which is 50% of urban GDP. This figure is basically in line with other studies of the share of capital in China's GDP. For instance, Wu (2000) uses a Cobb-Douglas production function with constant return to scale to estimate a production function for the Chinese economy. His study is based on regional (27 out of 30 provinces in China) panel data between 1981 and 1995. His result shows that the share of capital contribution was 47.3 per cent.

These basic figures of the urban economy in 2000 allow the calculation of the labour demand curve, as specified in equation (A6.3-1):

$$L = 319.7 - 9.5W^{d} \qquad \text{(A6.3-1)}$$

The estimated urban employment and the supply wages only provide one point of the urban labour supply curve. There is no sufficient information to estimate all coefficients of the curve. This gives one degree of freedom in choosing the wage elasticity of labour supply. For a given wage elasticity, the coefficients of the supply curve can be calculated. Some sensitivity tests of various values of the wage elasticity of labour supply are conducted and briefly discussed in the main text. When the elasticity of

[10] The figure is from SSB (2001a). Wages to employees of the taxation system is not available
[11] Author's calculation based on SSB (2001a).

labour supply is assumed to be unity, the supply curve passes the origine point in Figure A6.3-1:

$$L = 21.4W^s \qquad \text{(A6.3-2)}$$

A6.3.2 Some Details of the Simulation Methods

Once the labour supply and demand functions are estimated for 2000, they can be used to simulate the economy for the next 50 years. It is assumed that the government is facing the cost minimisation problem of financing its pension liabilities between 2001 and 2050. It has the choice between a PAYGO year-by-year financing strategy and an optimal taxation strategy. In the former strategy, the government simply collects enough payroll taxes (net of waste within the taxation system) to pay its pension liabilities for each year. It is a yearly-balanced strategy. No bonds are issued. In the latter strategy, the government needs to collect just enough payroll tax revenues over this 50-year period so that the present values of these revenues (net of waste within the taxation system) are equal to the present values of its liabilities over the same period. This is a 50-year balanced strategy. Since the latter allows the government to smooth out the tax burden over a longer period, it generates lower deadweight losses to the economy compared with that generated by the former.

As discussed in Section A6.2, the growth rate of wages, employment and GDP, etc. are determined by the growth rates of the parameters of the labour supply and demand functions, and when the two conditions of heir growth rates are satisfied, they grow at a time invariant rate for any given tax rate[12]. In other words, the growth rates of the key economic variables in the simulations can be exogenously chosen by picking the appropriate grow rates of these parameters. In addition, since the intercepts of the labour demand and supply curves must change at the same rate, and the slope of the two curves must change at the same rate, the growth of the economy is essentially determined by only two growth rates: one for the intercepts and the other one for the slopes.

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[12] In the PAYGO financing case, the tax rate varies with time and so the growth rates of these variables vary as well. However, they are ignored in the simulation.

In the simulations, the urban employment is assumed to grow at 1.39% per year based on World Bank's (1996) projections (Zhao and Xu 2002). To incorporate the population-aging factor into the simulation, the following approach is adopted to calculate the expected number of retirees over the 50 years.

Based on UN's (2001) projected population age structure for Chinese males and females at 5-year intervals, the yearly age structure of both sexes is interpolated for each year between 2000 and 2050. The current official retirement age in China is 60 years old for males and 55 year old for females. People who are aged between 15 and their official retirement age are of working age. Denote the national old-age dependency ratio for year t as $\rho_t^N = R_t^N / L_t^N$. This ratio can be calculated based on the annual age structure calculated previously. Here R_t^N is the number of people of retirement age or older, and L_t^N is the number of people of working age in year t, for the whole country. Denote urban employment in year t as L_t^U, and the pensioner/worker ratio in year t as $\rho_t^U = R_t^U / L_t^U$, where R_t^U is the number of pensioners in urban China in year t.

By definition, the number of pensioners can be calculated as follows:

$$R_t^U = L_t^U * \rho_t^U \qquad \text{(A6.3-3)}$$

In the simulations the expected number of urban pensioners is estimated as follows:

$$\hat{R}_t^U = \hat{L}_t^U * \hat{\rho}_t^U \qquad \text{(A6.3-4)}$$

where $\hat{R}_t^U$ is the expected number of urban pensioners in year t; $\hat{L}_t^U$ is the expected number of workers in urban China in year t, and $\hat{\rho}_t^U$ is the expected urban pensioner/worker ratio in year t .

$\hat{L}_t^U$ can be calculated as follows:

$$\hat{L}_t^U = \hat{L}_{t-1}^U(1+\eta) = L_{2000}^U(1+\eta)^t \qquad \text{(A6.3-5)}$$

where $\hat{L}_{t-1}^U$ is urban employment in year t-1, and η is the exogenously given annual growth rate of the urban employment[13]. In the basic model when the taxation system is assumed to be efficient, the optimal tax rate is constant, and number of urban employment is fully exogenous, depending on the employment in 2000 and the given growth rate of parameters. The growth rate of urban employment deviates from its optimal case in the PAYGO, year-by-year financing cases.

The expected urban pensioner/worker ratio in year t, $\hat{\rho}_t^U$, is estimated as follows:

$$\hat{\rho}_t^U = \sigma * \hat{\rho}_t^N \qquad \text{(A6.3-6)}$$

where $\hat{\rho}_t^N$ is the expected national pensioner/worker ratio. In the simulations, it is approximated by ρ_t^N, which is the national old-age dependency ratio based on UN's (2001) projection. Here σ is a correction coefficient for using the national old-age dependency ratio as the urban pensioner/worker ratio. This correction is necessary since the urban age structure may be different from that of the rural areas; or labour participation factors deviate the actual number of workers from the number of people of working age; and the fact that not all retired urban people receive pensions. σ is assumed to be fixed over time. It is set such that the calculated number of urban pensioners in 2000 is the same as the actual number of pensioners. σ is also useful in the sensitivity test simulations. It can be set to allow for faster or slower urban population aging compared with the national population aging.

In 2000, the average pensions were 7.91 thousand yuan per pensioner. In the simulation, the average pensions are set to grow at the same growth rate as that of net wages[14]. The average pension in period t is calculated as follows:

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[13] As mentioned before, when the tax rate changes, the actual growth rate of urban employment is slightly different from the exogenously imposed rate. This is ironed at this stage.

[14] Again, the actual growth rate of wages in simulations is also affected by the tax rate. The impact is often small and is ignored.

$$\hat{P}_t = P_{2000}(1+\gamma)^t \qquad \text{(A6.3-7)}$$

Where P_{2000} is the actual average pensions in 2000, γ is the exogenously chosen growth rate of net wages. Again, γ is the actual growth rate of net wages in the optimal case for the basic model where the optimal tax rate is constant. It is not in the PAYGO case.

Finally, with the expected number of retirees and the expected average pensions, the total public pension liabilities are calculated as the product of the number of urban pensioners and the average pensions.

How fast the Chinese urban economy will grow during the next 50 years? The official statistics show that between 1980 and 2000, China's real GDP grew at about 9.4% per year, while the average population growth rate was about 1.27% per year[15]. So, during the past two decades, per capita GDP growth rate in China was about 8% per year. It is unlikely such a high growth rate will be maintained during the next 50 years or so. Various studies predict quite different pictures of future GDP growth in China: with average annual growth rate of GDP varies between 4%-10% (Xu 1999).

In the simulations, the economic growth is measured in per capita GDP (or GDP per worker) growth rate, which is the same as the growth rate of net wages. Based on the growth rate of the Chinese economy during the past two decades, and the predictions of future growth, it is reasonable to assume the following scenarios of urban economic growth (expressed in per capita GDP) for the period of 2001-2050: 1) the rapid economic growth of 6% per year; 2) the medium growth of 4.5% per year, and 3) the slow economic growth of 3% per year. These are the cases simulated and they are listed in Table 6-4.

[15] Author's calculation based on SSB (2001b).

Chapter 7. Economic Transition, Population Aging and the Study of the Old Age Pension Reform in China: Individual incentives and efficiency

7.1 Introduction

The simple model discussed in the previous chapter illustrates the optimal taxation principle with regard to financing a defined-benefit public pension system over time. The simulation results in that chapter show that given the projected population aging in China during the next few decades, using payroll tax to finance the pension scheme will have to impose very high tax rates. If the pre-defined pensions are financed on a PAYGO year-by-year base, the payroll tax rate will have to rise to well above 50%. Even the optimal tax rate, which smoothes out the rising tax burden to minimise the deadweight losses, has to be as high as over 30%. This is not likely a feasible payroll tax rate. These results suggest that the government either has to use other taxes to finance the pension scheme, or to reform the scheme. This chapter focuses on the funded pension scheme as an option of pension reform, by examining the taxation impacts of an alternative pension schemes—the current, post-reform partially funded pension scheme in China.

While the previous chapter looks at options of the public pension scheme from the view point of smoothing the fiscal burden over time, this chapter examines the issue of individual incentives and efficiency. In particular, the discussion starts with two fully funded pension schemes. One of the schemes has contributions accumulated in individual accounts, while the other has all contributions pooled. These two extreme options of pension scheme are related to the future options for the Chinese pension program, since it is a partially funded scheme following the reform in the 1990s.

The taxation impact of a public pension scheme also depends upon specific regulations of fund management. The management of pension fund reserves not only affects fund returns, but also the credibility of relevant rules of fund management and thus the 'perceived taxation'[1] viewed by individual participants.

[1] This refers to the tax that individual participants would regard that is imposed by the pension scheme, rather than any explicit legal tax.

This chapter is organized in four parts. Part two looks at the economic theory of the possible taxation implication of a funded public pension scheme (when labour supply is exogenous). Part three analyses pension reforms in China during the 1980s and 1990s. It examines the reasons why the partially-funded scheme has been adopted and whether this is a good option for China. This part also includes some simple simulations for financing the transition costs, or the pension debt, for the pension reform in China. Some conclusions are drawn at the end.

7.2 The Taxation Impact of A Public Pension Scheme—Two Cases

7.2.1 A Brief Review of the Impact of Taxation and the Size of Deadweight Losses

In consumer theory, a tax is usually analysed as a price change that can be decomposed into a substitution and an income effect. Taxation of wages and savings can lead to changes of labour supply and savings decisions that affect individual welfare. In theory, taxation, as government intervention in a competitive market, often also generates a so-called 'deadweight loss' to the economy.

For example, consider an individual who lives for two periods, the current and the future period. The individual has an exogenous amount of income, Y, during the current period and no exogenous income in the future period. The market return on capital is r. The individual faces an intertemperal budget constraint shown as YY(1+r) in Figure 7-1. Consumption is denoted as C^P in the current period and as C^F in the future period. The individual chooses optimal C^P and C^F to maximise his utility. This problem is demonstrated in Figure 7-1, where the individual's optimal choice is E_0, with consumption in the two periods at C_0^P and C_0^F, respectively. As a result, the individual chooses to save S_0.

Now suppose that the government imposes an income tax on return of savings, with a flat rate τ. From the individual's point of view, the return on savings is no longer r, it is $r(1-\tau)$. Now the individual is facing a flatter budget constraint, $YY[1+r(1-\tau)]$, since the relative price of future consumption is higher. The substitution effect of this price change is for the individual to switch from future to present consumption, indicating that savings will fall. The (relative) price change also has an income effect, since the

overall income, including return of savings, is lower due to the tax. If both present and future consumption are normal goods, then the income effect is to reduce both present and future consumption, and to increase savings. The net impact on savings depends on the relative size of the substitution and income effect. Figure 7-1 shows the case when the substitution effect is larger than the income effect, and savings fall to S_1. The new optimal choice for consumption is at point E_1. The individual's utility falls from U_0 to U_1.

The tax on the return on savings not only affects individual welfare, it also generates a deadweight loss for the economy as a whole, due to the behaviour change caused by the substitution effect. More specifically, the deadweight loss in this case is the loss of unrealised potential gains of trade in the loanable funds market. In Figure 7-2, the compensated demand curve for loanable funds is D, and the compensated supply curve for loanable funds is either S1 or S2. The two possible supply curves have different slopes, indicating the different responsiveness of savings supply to interest rate change. S1 represents a higher interest rate elasticity of savings, compared with S2. When the tax on the return on savings, τ, is imposed, it drives a wedge between the interest rate paid by borrowers, $r_1 + \tau$, $r_2 + \tau$, and that received by lenders, r_1 and r_2, respectively. The associated deadweight loss can be represented by the triangles ABC and EBD, respectively, for S1 and S2.

Even though not shown in the figure, obviously, the deadweight loss would be larger when the tax rate is higher, *ceteris paribus*. The size of deadweight loss is also related to the price elasticity of demand and supply. In Figure 7-2, comparing the two supply curves, S1 and S2, gives the following two observations for a given demand curve of loanable funds: (1) the savers (lenders) bear more tax burden, $r_2 < r_1$, when the savings supply is less responsive to interest rate changes, that is, when S2 is steeper than S1; (2) the deadweight loss is higher when the supply curve is flatter, that is, more elastic (area ABC > area EBD). In general, the size of the deadweight loss can be expressed as a function the tax rate, the price elasticities of demand and supply:

$$\frac{1}{2} \cdot \frac{1}{\left(\frac{1}{\varepsilon_1} + \frac{1}{\varepsilon_2}\right)} t^2 . S \qquad (7\text{-}1)$$

where ε_1 is the absolute elasticity of supply and ε_2 is the absolute elasticity of demand; t is the tax rate and S is a constant[2]. The term $\frac{1}{1/\varepsilon_1 + 1/\varepsilon_2}$ is the reciprocal of the sum of the reciprocals of the individual elasticities. In the case in Figure 7-1, it is assumed that the demand for savings is infinitely elastic, so that $\varepsilon_2 = \infty$ and $\frac{1}{\varepsilon_2} = 0$. In this case, the deadweight loss is $\frac{1}{2}.\varepsilon_1 t^2 s$.

7.2.2 The Taxation implication of a Fully Funded Public Pension Scheme, with Individual Accounts (Exogenous Labour Supply)

7.2.2.1 The General Setting of the Model

Consider an economy where individual employees live for two periods: the present and the future period. During the present period, the individual, let us assume she is female, works and earns an exogenously given salary. During the future period, the individual retires and receives no exogenous income. When there is no public pension scheme, her problem is to decide how to divide her labour income into consumption in the two periods, in order to maximize lifetime utility. The utility is assumed to be a function of her consumption during the two periods.

When a mandatory public pension scheme is introduced, she might change her prior optimal choice. This section looks at the possible outcome of her choices, when the public pension scheme is fully funded, and where all contributions are made by the employee[3] and are accumulated in an individual account owned by the employee.

Formally, the employee's utility function can be written as U (C^P, C^F), where C^P is consumption during the present period, and C^F is consumption during the future period. The exogenously given labour income during the present period is denoted as Y. Market (real) return on savings is denoted as r. The employee is subject to the following budget constraint:

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[2] Strictly speaking, s depends on the parameters in the supply and demand curves, as well as the tax rate. In cases when tax rate is small, S is approximately a constant.

[3] When Labour supply is assumed to be exogenous, pension contribution has no impact on labour supply. The burden of pension contribution falls on employees.

$$C^P + \frac{C^F}{1+r} = Y \tag{7-2}$$

Or written in the following equation:

$$C^F = (Y - C^P)(1+r) \tag{7-3}$$

In the mandatory public pension scheme, employees are required to contribute a flat rate, τ, of labour income into an individual account, owned by the employee. Funds in the individual account are accumulated and will be paid back to the employee as a pension to finance consumption in the future period. The return on funds in the individual account is denoted as ρ. This pension scheme changes the employee's budget constraint to:

$$C^F = [Y(1-\tau) - C^P](1+r) + \tau Y(1+\rho) \tag{7-4}$$

Equation (7-4) can also be written as follows, which makes it easier to compare with the original budget constraint (7-3):

$$C^F = (Y - C^P)(1+r) + \tau Y(\rho - r) \tag{7-5}$$

In addition to the above budget constraint, it is assumed that there is a private savings constraint as follows:

$$Y(1-\tau) - C^P \geq 0 \tag{7-6}$$

Equation (7-6) assumes that after pension contribution, the representative employee's private savings must be non-negative. This assumption can be regarded as the result of a liquidity constraint that the employee cannot borrow against future pension income.

7.2.2.2 The Impact of a Fully Funded Pension Scheme on Employees' Choices

The implication of a fully funded pension scheme on employees' choices depends upon whether or not the private savings constraint, equation (7-6), is binding or not. In practice, only the latter case is interesting because governments generally introduce mandatory pension schemes in order to force individuals who otherwise save little to save more, but for completeness, both cases are analysed here. The private savings constraint will not be binding if an employee saves a lot prior to the public pension scheme being introduced, that is, when prior savings are more than pension contributions to the pension scheme. The private savings constraint is binding when an employee only saves little for retirement prior to the public pension scheme, and borrowing against future pension benefits is impossible in the economy. This perhaps is not a bad assumption in many economies, but is especially relevant in a developing economy, where the financial market is under-developed.

In Figure 7-3, present consumption (and income), C^P, and future consumption (and income), C^F, is represented by the horizontal and the vertical axis, respectively. Assume individuals can lend as much as they wish in the market with a return of r. The budget constraint for an employee before the introduction of the public pension scheme is the downward sloping line, YY(1+r), with the slope of -(1+r).

Now the government imposes a fully funded public pension scheme mandatory for all employees. A representative employee faces a new budget constraint as in equation (7-5). When comparing with the budget constraint before the public pension scheme, equation (7-3), equation (7-5) indicates that whether or not the scheme has any impact on an employee's budget constraint depends upon the relative sizes of r and ρ. The relative price of present and future consumption is not affected by the pension scheme, but there will be a pure income effect when $\rho \neq r$. In Figure 7-3, the budget constraint of one of the cases, $\rho < r$, is drawn as the double-dashed line, BCY(1-τ). The initial equilibrium when there is no public pension scheme is indicated on the budget line YY(1+r).

For this cases when $\rho < r$, the new equilibrium with the public pension scheme depends upon whether the private savings constraint, equation (7-6), is binding or not. Both

cases are shown in Figure 7-4, where only the new budgetary constraint after the pension scheme is drawn.

The new equilibrium, when the private savings constraint, equation (7-6), is non-binding, is shown as the left panel in Figure 7-4. It is the result of a pure negative income effect of the public pension scheme. When consumption in present and future period is normal goods, this income effect reduces consumption in both periods, while increases savings. The (absolute value of the) gradient of the tangency is the same as that of the budget line BC, that is, (1+r). The more interesting case, when the private savings constraint is binding, is shown as the right panel in Figure 7-4. The new equilibrium is at point C, where the lines BC and CY(1-τ) meets. Given that the slope of BC is -(1+r), while the slope of CY(1-τ) is $-\infty$, the (absolute value of the) gradient of the tangency passing point C must be larger than (1+r). This result shows that even though the rate of return on pension contributions is less than that of market return on savings, that is $\rho < r$, the public pension scheme acts like a subsidy to savings because the gradient of the tangency is larger than (1+r).

The other cases when $\rho = r$ and $\rho > r$ can be analysed in the similar approach as in Figures 7-3 and 7-4. The main impact of the public pension scheme is summarised in Table 7-1.

The table shows that when the private savings constraint is binding, the public pension scheme always acts like an implicit subsidy to savings, regardless of the relative magnitude of ρ and r. This subsidy increases savings compared with the case when there is no such a public pension scheme.

7.2.3 A Production Possibility Frontier (PPF) Analysis of the Public Pension Scheme

The analysis in the last section shows the impact of the public pension scheme on individual participants. A simply extension of the analysis is to examine possible impacts of such a scheme on the aggregate level of the economy. In this section, two different production possibility frontiers (PPF) are used to compare the outcome of the public pension scheme that aims at achieving the same amount of future aggregate

consumption. In both cases, it is assumed that the public pension scheme does not involve any production inefficiencies, that is, the PPF does not shift after the introduction of the pension scheme.

The results are drawn as Case I and Case II in Figure 7-5. In the left panel (Case I), the PPF is a straight line, denoted as AB, while the PPF in the right panel is concave, denoted as CD. The only difference between the two cases is the slope of the PPF. The slope of PPF represents the marginal rate of transformation between consumption in the present and future periods. In case I, the PPF has a constant slope, $-(1+r)$, where r is the domestic interest rate. The assumption here is that domestic savings in the economy has no impact on the domestic interest rate. This would be the case when the following conditions hold: (1) this is an open economy; (2) this economy is a small part of the world capital market; and (3) all goods in the economy are tradable. These conditions allow the analysis of a case that is a useful first approximation. In Case II, the PPF is a curve that has the usual shape of bowing outwards. This is the case when the above three conditions do not hold. In this case, when the public pension scheme increases domestic savings, the domestic interest rate falls[4].

The trade-off is between consumption in the present (C^P) and future period (C^F), which is similar to that in Figures 7-3 and 7-4. However, here we examine the economy as a whole. The PPF describes the maximum possible bundles of aggregate consumption in the two periods for the economy. Assume the original equilibrium, before the introduction of the public pension scheme, is at point E_0 in both cases. As discussed in the last section, when the private savings constraint is binding, this pension scheme acts like a subsidy to savings and thus increases savings. In both cases, the new equilibrium is on the original PPF but to the left of E_0, denoted as E_1 in case I, and E_2 in Case II, respectively. The gradient of the tangency at E_1 and E_2 is denoted as $(1+\rho_1)$ and $(1+\rho_2)$, respectively, while that for E_0 is $(1+r)$. To move the initial equilibrium point from E_0 to the new position of E_1 and E_2, the pension scheme has two effects on the economy: an income effect through the lump sum tax (or payroll tax when labour supply is inelastic),

[4]In addition, when labour supply is not perfectly inelastic, and the public pension imposes a tax on labour, this will tend to reduce labour supply. A lower labour supply will further drive down the marginal product of capital and, therefore, the domestic interest rate, r. This case is not discussed here.

and a substitution effect through the subsidy to savings. Since both E_0 and E_1 are on the same PPF, AB, the tax must be equal to the subsidy. This is also the case for Case II.

Preferences are assumed to be identical in both cases. The comparison between the two cases in Figure 7-5 is as follows. The initial equilibrium, E_0, is identical for the two cases, that is, the consumption is the same for case I and case II, in both periods. Assume the government designs the public pension scheme to achieve a given level of future consumption in both cases. So, at the new equilibrium, E_1 in case I and E_2 in case II, future consumption (C^F) is identical.

The comparison is drawn in the right panel (Case II) in Figure 7-5. For this purpose, the PPF (AB) and the new equilibrium (E_1) in the left panel are also shown in Case II. The introduction of a public pension scheme moves the equilibrium from E_0 (on both AB and CD) to the left on the PPF, at E_1 and E_2, respectively. The figure shows that E_2 must be to the left of E_1. Consider income expansion paths (IEP) drawn through E_0, E_1 and E_2. If C^P and C^F are normal goods, all income expansion paths are upward sloping. Therefore, $\rho_2 > \rho_1 > r$.

This comparison shows that the pure substituting effect in favour of future consumption must be larger in Case II than in Case I, if the increase in future consumption is to be the same in comparisons between 'pension scheme ' and 'no pension scheme'.

7.2.4 A Public Pension Program with Social Pooling (Inelastic Labour Supply)

One of the main features of the current Chinese pension program is that it has a social pool of pension funds, which collects part of pension contributions. The pooled funds are used to provide an elementary pension, as part of the basic pensions (see Chapter 4) for participants with at least 15 years of contribution, which equals 20 per cent of the provincial average wage. To analyse this element of the current Chinese pension system, we consider a pension system in which (unlike the actual Chinese system) all contributions are completely pooled and each individual's pension is unrelated to his, or her, contributions.

Assuming inelastic labour supply, the social pool taxes the rich to subsidize the poor. To ensure the social pool is financially sustainable, the subsidy should be equal to or less than the tax revenue. The implications of the social pooling are analysed in the two-period model. Figure 7-6 shows the impact on the 'rich' and the 'poor', where the 'rich' is defined as the net contributor to the social pool, while the 'poor' is defined as the net gainer from the pool. In other words, the rich lose income while the poor receive higher income due to the social pooling.

For the rich, the intertemporal budget constraint before the pension scheme is AB. Distance OB is the (exogenous) labour income of the rich during the present period, OA equals OB(1+ r), where r is the market interest rate. Now the rich have to pay contribution T = DB in the present period to the social pool, which moves the budget constraint to CD. This contribution will in turn pay him/her a fixed pension of P during the future period. P<T (1+r), since the rich is the net contributor to the pool. The new budget line of the rich ends up at FG, which is below AB. Obviously, the social pooling of pension contributions imposes a lump sum tax (or payroll tax in this case) on the rich.

The social pooling provides the poor with a subsidy to their lifetime income. As shown in the right panel of Figure 7-6, the original intertemporal budget constraint is A'B'. The compulsory pension contribution moves the budget line to C'D' when the poor contribute T' = D'B'. With the fixed pension benefit, P, the new budget constraint with the social pooling is F'G', which is above the original one, A'B'. The poor receive a subsidy through the social pooling of pension contributions.

7.3 Some Comments on Recent Pension Reforms in China

The discussions in this chapter have provided a general framework to look at the taxation implications of a funded public pension system. This section uses this framework to examine pension reforms in China during the 1980s and 1990s[5], from both the short and the long run point of view, with the focus on the current pension system. The recent pension reforms are discussed in greater details in Chapter 4.

[5] Details of the pension reforms are discussed in Chapter 4.

Therefore, they will only be described briefly in the following sections before the comments are made.

7.3.1 The Pooling of Pension Fund among SOEs

The first of the Chinese pension reforms started in the mid-1980s, when the old work unit-based pension system was facing the problem of unbalanced pension liabilities among SOEs (Han and Jiao 1997)[6]. To help SOEs with financial difficulties to fulfill their pension liabilities, the local agent of the Department of Labour (now Ministry of Labour and Social Security) in cities stepped in. The agent required all SOEs in the region (county or city) to contribute to a local pool of pension funds, which then paid out their pension liabilities. Since the contribution was made at a unified rate of total wages, the social pooling levelled the burden of pension liabilities among (local) SOEs.

To some extent, the social pool of pension funds moved the old pension system away from the work unit-based system towards a local social pension system, which was supposed to include all local SOEs. Ideally, as long as the local SOE sector could afford to pay pensions (out of current revenue), the old PAYGO system would be sustainable.

From a taxation point of view, this reform unified the tax burden of pension liability among local SOEs. If the marginal cost of taxation increases with the tax rate, a unified tax burden generates a smaller deadweight loss, for the same amount of tax revenues.

However, this reform did not address issues of long-term concern, such as the aging population and shrinking coverage of the program, which were related at the time. On the one hand, the Chinese population was expected to age fairly rapidly from the end of the 20th century until the mid of the 21st century, which meant rising retiree/worker ratio of the population. On the other hand, since the old urban PAYGO scheme covered only employees in SOEs, population aging was expected to be even quicker and more significant for the population covered by the old PAYGO pension scheme than for China as a whole. As mentioned in Chapter 4, as long as there was an alternative, young employees in the SOE sector had an incentive to move to other sectors to avoid paying

[6] See Chapter 4 for details of the background of this reform.

pensions for the current retirees, while the older employees had an incentive to remain, in order to get their pension. This incentive mechanism suggested that the old PAYGO system would break down fairly soon, unless the universal coverage was imposed by government regulations. Since the social pooling of pension funds did not solve these problems, the old PAYGO pension scheme was facing a rapidly aging population covered by the system, and the pressure to increase the payroll tax rate to finance pension payments.

The social pooling of pension funds among SOEs also had its intrinsic problem in the short run, that is, the adverse selection problem. Since the contribution rate was unified, SOEs that had higher pension liabilities and therefore higher pension/payroll ratios would take part in the pool, while SOEs that had smaller pension liabilities would try not to join the social pool. The result would be a social pool with too many SOEs with high pension liabilities, which would force the contribution rate to rise. This was especially the case when the social pool was not mandatory, and some local SOEs were under the administration of a government at a higher level than the local pool.

7.3.2 The Employee Contribution

The second major step of pension reform occurred in 1986, when the central government required employees to contribute to pension funds. This reform was intended to add a new source of pension funds to relieve the financial burden of the PAYGO pension system (Han and Jiao 1997).

In 1986, newly employed contract workers of SOEs were required to contribute to pension funds. Employee contributions were then extended to all employees of SOEs in the early 1990s, at the rate of 3% of wages. At this stage, employee contributions were pooled together with contributions of SOEs to pay pensions for current retirees (Han and Jiao 1997). From an employee's point of view, this reform simply imposed a payroll tax, since neither the contribution years, nor the actual amount of contributions, which also depended on wages, was directly related with expected future pension benefits.

While the tax rate was increased by the introduction of employee contributions, the long run problem of the old PAYGO pension scheme was not solved. As the theoretical model in Chapter 6 shows, the optimal payroll tax rate to financing pensions for an aging population is to smooth out the tax burden over time. The simulation results in Chapter 6 also indicate that for the case of China, even the optimal tax rate is very high to be a feasible payroll tax rate. As Table 7-2 shows, even though the revenue of pension funds increased from 1989 to 1999, outlays also rose. In 1998, the outlay was actually more than revenues for that year.

In the last column of Table 7-2, the figures show how many months of pensions the accumulated fund surplus could pay at the year-end. This figure rose and fell during the period. At the end of 1999, the pension fund surplus was the lowest, with only around 5 months of payment in reserve. From an insurance fund point of view, a seven or eight-month payment surplus is probably more for an emergency purpose, rather than a reserve for future payment at a peak time when the population aging accelerates.

The reform of introducing employee contributions did not sufficiently increase the surplus of pension funds to prepare the old PAYGO system for the aging population covered by the scheme, which would become more critical over time with the limited coverage of the scheme. As in the case of the first pension reform of pooling pension contributions, this reform failed to address other issues, such as the shrinking coverage of the public pension scheme.

7.3.3 A Three-Pillar Pension Scheme with Individual Accounts and the Social Pool

The most recent reforms of the public pension system in China included two major changes in 1995 and 1997, respectively, which replaced the old PAYGO system with a three-pillar pension system. In the current pension scheme (2002), the first pillar is a scaled-down PAYGO system that provides the so-called elementary pensions. The second pillar is a compulsory, funded system of individual savings account that provides the so-called individual account pensions. The third pillar is a half-voluntary enterprise supplementary pension (Han and Jiao 1997; Liu 2000). It is expected that the first two pillars will provide a basic income to retirees as the so-called basic pensions, which include the elementary pensions and the individual account pensions. Policies

and detailed regulations with regard to the third pillar are not formalised by the government, so the focus here is on the first two pillars that are mandatory: the scaled-down PAYGO component and the funded individual accounts.

7.3.3.1 Lower Replacement Rates of the Basic Pension System

As discussed in Chapter 4, the old PAYGO pension scheme in China used to provide pensions with a high replacement rate. High replacement rates were both necessary and possible during the pre-reform period. The necessity was due to low wages determined by central planners. A reasonably high replacement rate was then needed to provide a basic living during retirement. The possibility was due to: (1) a relatively young labour force in cities; (2) a centrally planned economy where the government could collect the surplus of various economic activities through price-decisions, in particular could tax the agricultural sector to subsidize the industrial sector; (3) relatively low wage rates determined by the central planners.

In the new pension scheme established by reforms in 1995 and 1997, the liability of the public pension scheme was reduced by lower replacement rates. Under the new scheme, it is expected that the combined replacement rate provided by the elementary pension plus the individual account pension is only around 60 percent for individuals with 35 year of contributions, compared with 80 percent in the old PAYGO scheme (Han and Jiao 1997).

In Table 7-3, replacement rates of the old PAYGO pension scheme, of reform proposals in year 1995, and of the major reform in year 1997 are compared, for employees with various years of contributions.

Observations from the table show two distinct features of the new pension schemes following the reforms in 1995 and 1997:

(1) The replacement rates are much lower in the new scheme than in the old PAYGO scheme. This is true for workers with different lengths of contribution/employment. For example, following the 1997 reform, for workers with a 15-year contribution/employment, the replacement rate is only 36.5 per cent, which is roughly half the rate of the old PAYGO pension scheme. The gap

between replacement rates for 20-year and 35-year contribution/employment is 35 and 21.5 percentage points, respectively.

(2) The comparison of replacement rates in the same column shows how much the length of employment/contribution affects pension benefits under each system. In the old PAYGO scheme, there was only a 5-percentage points penalty for workers who worked for 15 rather than 20 years, with the same penalty for workers who worked for 20 rather than 35 years. By contrast, in the new pension scheme following the 1997 reform, workers will be penalized by 18.5 percentage points in replacement rate if they contribute for only 20 rather than 35 years. However, the penalty is only 3.5 percentage points for workers who contribute 15 rather than 20 years.

A lower replacement rate would reduce pension liabilities. More importantly, the discussion in Chapter 6 shows that the tax/contribution rate of a public pension scheme depends critically on the targeted replacement rate of the scheme. The lower the replacement rate, the lower will be the tax/contribution rate associated with the pension scheme, *ceteris paribus*. If pension contributions are collected from payroll taxes, a lower tax rate reduces the deadweight loss on the economy, which improves economic efficiency.

In addition, setting a low replacement rate helps to address the population aging problem to some extent. By reducing public pension liabilities, it allows the budgetary cost of the scheme to be met by only modest increase in taxation even though the population is aging. As explicitly stated in the new, three-pillar public pension system in China, the government is only committed to providing a 'basic pension', which should be supplemented by other voluntary pensions from firms or individuals.

From an employee's point of view, feature (2) of the new pension scheme as illustrated in Table 7-3 indicates that the old PAYGO system had a much higher tax component than the current system after the reforms in the 1990s. For example, for workers earning the same wages, working an extra 20 years under the old PAYGO system would only add 10 percentage points to pension. Under the new system, it adds 22 percentages points.

It is worth noting here, though, that the implications of the replacement rate for the old PAYGO system and the new three-pillar system are quite different. Under the old PAYGO system, wages were determined by the government, and were usually very low (see Chapter 3). A minimum pension would require relatively high replacement rates. During economic reform, wage rates have been rising sharply (see Chapter 4). Accordingly, relatively lower replacements rates in the new basic pension system would be able to provide a basic living for retirees.

The tax/contribution rate of a public old age pension scheme is not only affected by the targeted replacement rate, but also by the closeness between the contribution and the benefits. Individual savings accounts are an important component of the present pension scheme in China.

7.3.3.2 The Individual Account in the New Pension Scheme

Individual accounts have been adopted nationwide as a result of the pension reform in 1995. However, the contributions to individual account varied across cities and provinces. The reform in 1997 aimed at unifying all pension schemes within a province. Once the current public pension scheme reaches its target, individual accounts are composed of the total (employee and employer) contribution of 11% of a worker's wages.

The Ownership of Individual Accounts

These reforms have aimed at establishing an individual worker's ownership of the individual account. Individual employees own individual accounts, which are under their names. This ownership indicates that employees will receive (individual account) pensions from the account. Employees who are not eligible for the unified pensions from the social pool due to short period of contributions will get back all funds in their individual accounts upon retirement, including both employee and employer contributions, as well as interest on the funds. This ownership also allows employees' relatives to inherit part of the residual funds in their individual accounts should they die. This includes the employee contributions and interest, but not the employer contributions. This rule shows some confusions in the current pension scheme about the

ownership of individual accounts: are employers contributions in individual accounts treated as workers' deferred labour income or not?

Perhaps more importantly, the ownership of individual accounts establishes a close link between pension contributions and future pension benefits. An individual account pension is one of the two parts of the basic pension, provided by the public pension system. In particular, for workers with long-term contributions, it will be the major source of future pensions. Currently, the monthly individual account pension is stipulated as 1/120 of total funds in an individual account at retirement. This means the more a worker earns during his/her working life, and therefore the higher employer and employee pension contributions, the more funds accumulated in the worker's individual account, and the higher the expected pension the worker will receive during retirement, *ceteris paribus*.

Individual accounts in China's public pension scheme aim at establishing a simple but clear relationship between pension contributions and pension benefits. This direct link is the key to reducing the (perceived) tax rate associated with a public pension scheme. However, the rule with regard to inheritance of the residual funds in individual account indicates there is inconsistency in the system, that is, whether employer contributions are also part of a worker's (deferred payment of) labour income, or not.

Rate of Return on Funds in Individual Accounts

There are other factors affecting the effectiveness of using individual accounts to reduce the tax burden of a public pension scheme. One of them is the return on funds in individual accounts. The previous discussion in this chapter shows that the taxation implications of pension contribution would be smaller, the closer the rate of return on funds in individual account is to the market rate of return.

The current Chinese pension system adopts a so-called 'accounting interest rate' approach. Every year, the provincial government determines a rate of return, the 'accounting interest rate' on funds in individual accounts, with reference to bank deposit rates (Han and Jiao 1997; Liu 2000). The interest on funds in individual accounts is credited to the account at the end of the year, according to this accounting interest rate. Since government bonds are the only legal investment channels for pension funds,

except for a small amount of emergency reserves deposited in state-owned banks, the central government prefers the interest rate on government bond rather than the rates offered by the state-owned banks[7] (Liu 2000).

One problem with this accounting interest rate approach is that it does not necessarily reflect the market return on savings. While the return on government bonds is slightly higher than the interest rate offered by the state-owned banks, the latter is still under the control of the central government. Since the government controlled interest rate is often well below the market interest rate, the accounting interest rate of funds in individual accounts tends to be lower than the market return. This implies that employees' labour income is taxed by the pension scheme.

This problem is exacerbated by the fact that provincial governments have an incentive to choose a low interest rate for pension funds. As part of a mandatory public pension scheme operated at the province level by the local government, the accounting interest rate affects the future liabilities of the local government to owners of individual accounts. The higher the interest rate chosen to calculate the return on pension funds, the higher the future liabilities of the local government to account owners.

The relationship between the return on pension funds and the local government liability for pension payment, that is, the total funds available at an employee's retirement, can be illustrated by equation (7-7). Suppose that an employee's wages rise at a constant rate of g per year, and denote the first year wage as Y, the contribution rate for the individual account as τ, the number of years of contribution as T, and the annual rate of return on pension funds as γ. The total fund available to pay pensions at retirement, P, is given by the following formula (the discrete time case):

$$P = \tau Y * \frac{(1+\gamma)^T - (1+g)^T}{\gamma - g} \qquad (\gamma \neq g) \qquad (7\text{-}7)$$

[7] As many policies in China, the central government often only sets up the guidelines or frameworks of policies for the local governments (provinces), so that the provincial governments have room to adjust the details of the policies to their local conditions.

The formula indicates that P is sensitive in response to changes of γ. For instance, suppose workers' real wages rise at a rate of 10% per year, with 30 years of contributions at the rate of 11% of wages, as in the current Chinese pension scheme. Upon retirement, these workers would have funds in their individual accounts increased by more than 30%, when the accounting interest rate rises from 5% to 7.5% per year.

Portability of Individual Accounts

In order to reduce the taxation impact of a public pension system, individual accounts should be portable, in the sense that changing jobs has no impact on accumulated pension contributions in an individual account. Portability thus removes the possible barrier to labour mobility caused by employer contributions into individual accounts.

According to the current regulations of the pension scheme in China, the individual account is only partially portable. The social pooling area is at a province level, and pension contributions are managed by the provincial social security agency. Changing jobs within a given province does not involve any transferring of funds, but only some record changes. In this sense, individual accounts are fully portable. However, if the employee moves to a different province he, or she, can transfer all employee contributions and employer contributions since 1998, but not earlier employer contributions (Liu 2000). In this case, individual accounts are not fully portable. What is not portable is the accumulated value of employer contributions before 1998 when an employee moves from one province to another[8].

To summarise, using individual accounts as a vehicle to accumulate pension funds for individuals could reduce the tax component of pension contributions, providing that the account is fully owned by individual workers/contributors, earns a market return, and is fully portable.

The Proportion of Pension Contributions in Individual Accounts

Creating individual accounts with the features of individual ownership, market return and portability would remove the taxation implications of the pension system if all contributions were paid into such accounts. However, if only a small proportion of

[8] In general, the amount of employer contribution accumulated in individual accounts depends on the local pension reform: when it was started and what was employer contribution rate.

contributions are put into such accounts, while most contributions are pooled to pay a flat rate pension to every contributor, the tax burden of the pension scheme would be much higher. As discussed in part 2 of this chapter, the social pooling of pension contributions taxes the labour income of the rich and subsidises the poor.

In the current Chinese pension system, the social pooling component even imposes tax on workers earning the average wages. Among the targeted total (employer and employee) contribution is 28 per cent of wages, which is composed of a 20 per cent employer contribution and 8 per cent employee contribution. Among the 28 per cent of wages that are contributed, 11 per cent of wages are accumulated in individual accounts, which is only about 39 per cent of total contributions. The implication of this partially funded pension system can be analyzed by comparing it with a hypothetical pension scheme (Scheme H), which has the same contribution rate (28% of wages), but with all contributions accumulated in workers' individual accounts. For simplicity, also assume that in Scheme H, pensions paid from individual accounts equal to 1/120 of funds available at retirement. Table 7-4 compares the replacement rates of the current Chinese pension scheme with scheme H. For convenience, results are calculated for workers whose real wages are equal to the local (provincial) average wage. It is also assumed that the return on funds in individual accounts is the same as the growth rate of wages, and that pensions grow at the same rate as wages. The retirement period is assumed to be 10 years[9].

The comparison between column A and B shows that with the same contribution rate (28% of wages), a worker earning the local average wages receives a higher pension (shown as higher replacement rates) in Scheme H than in the current Chinese pension scheme, regardless of the length of working/contribution period. In fact, it is clear that the longer the contribution, the more significant the difference is[10].

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[9] With this assumption, the formula (for the discrete case) for calculating replacement rate is simplified as: $B=\frac{T*\tau}{10}$, where B is replacement rate, T is number of years of contribution, and τ is contribution rate. This formula follows the practice in the current Chinese pension scheme that the first year pensions equal to 1/10 of funds available in the individual account.

[10] Except for the case with only 10 year of contribution, when the worker does not receive the 20% elementary pension from the social pooling fund.

This result is due to the fact that in the current Chinese pension scheme, the social pool is used to pay pensions of current retirees, who do not contribute to the pool. For workers with less than 15 years of contributions, they lose all their contributions to the social pool, since they are not qualified for the universal 20 per cent pensions, or the so-called 'elementary pensions'. Even for workers with 15 or more years of contributions, their pensions from the social pool, the 'elementary pensions', are defined benefits, which is at the level of 20 per cent of the average provincial wages, regardless of how long and how much they actually contribute to the social pool. In other words, the social pool in the current Chinese pension scheme does not operate on the actuarially fair base. Therefore, even workers who earn the average wages do not get their contributions back as pensions. Given the feature of defined-benefits, the longer workers contribute to the social pool, the bigger the differences between the current Chinese pension scheme and the hypothetical Scheme H.

Another way to see the difference of the taxation impact between the two pension schemes is to look at extra pensions gained with longer years of contribution. While an extra 20-years of contribution (from 15 to 35 years) brings an extra 20 percentage points of replacement rate for workers in the current Chinese pension scheme, it would bring an extra 46 percentage points for the same workers if they were in Scheme H (comparing columns A and B).

In column C in Table 7-4, the figures are the required contribution rate (% of wages) for workers with Scheme H, but to achieve the same replacement rate as with the current Chinese pension scheme. The first observation is that the longer the contribution period, the lower the contribution rate required to afford the same replacement rate as in the current Chinese pension system[11]. This observation shows that the longer workers stay in the current Chinese pension system, the higher the tax burden they bear. This is shown in the last column in Table 7-4, where these calculated contribution rates are subtracted from the contribution rate of the current Chinese pension scheme, which is 28%. The results can be regarded as the excess contribution rate of the current Chinese pension scheme, compared with Scheme H. In particular, workers who have contributed for some years but not long enough to be eligible for the flat rate pension[12] bear the

[11] Except the shortest contribution year of 10 years.
[12] This refers to the elementary pension that equals to 20% of the provincial average wages.

highest excess contributions. For example, workers with 10-year contributions would only need to contribute 11% of wages in Scheme H to receive the same pensions they would get from the current Chinese pension scheme, where they contribute 28% of wages. The excess contribution, 17% of wages, is a payroll tax imposed on these workers by the current Chinese pension scheme. For those who are eligible for the flat rate pensions[13], the longer the contribution period, the higher the excess contribution, or payroll tax, they have to pay, in order to receive the same replacement rate as in Scheme H.

The 'Empty Account 'Problem

There are concerns with the present Chinese pension scheme with regard to the fact that funds in individual accounts are used by local governments to pay pensions for current retirees (Li 1998). This leads to the so-called notional individual account, or 'empty ' account problem. To analyze this issue, it is important to realize that it is not easy to know whether or not an account is 'empty', nor to define what 'empty' means. For example, when an individual, A, deposits $100 in a bank account, it is almost certain the bank will lend out majority of these funds, say $90, as a bank loan to somebody else, leaving A's account largely, or 90%, 'empty'. However, if A comes to ask for the $100 from the bank a month later, the bank will give A the $100, perhaps by 'emptying' somebody else's account. As such, provided there is not a bank run, the bank can always pay back the money when any individual depositor needs it, despite the fact that all bank accounts are mostly 'empty', in the sense of not being matched by cash, only by loans.

As for the notional individual account in the current Chinese pension system, the similarity with the bank account is that most contributions into individual accounts are not kept as cash. Yet people might argue that the situation in the Chinese pension system is different, since the bank would use 90% of the money that is not held in cash to acquire good quality loans that is very likely to be paid back, with a good return on the loans, while the local Chinese government does not necessarily use the cash in individual accounts in this fashion. It is found that funds in individual accounts are used to pay pensions for present retirees, invested in local infrastructure, real estate, stocks, etc (Han and Jiao 1997). Paying pensions to current retirees is to pay government debt

[13] They are workers who have 15 or more years of contribution/working.

in pension liabilities, which will mostly be used for consumption. The other investment decisions made by the local government could incur a higher risk of not being able to get the money back.

From an employee's point of view, the key issue is neither whether or not their individual accounts are 'empty', nor how 'empty' they are; it is whether or not the local government, as the management authority of their individual accounts, can pay back the money in the account when they retire. As long as they believe their future pension from their individual account is secure, they would regard the pension contribution into their individual account as part of their deferred payment[14], rather than taxes. And provided that the government's assets, including its future tax revenues, are sufficient, they would be all right.

The policies of individual accounts in the current Chinese pension system are clear, with regard to ownership, as well as the rules for calculating returns on funds. With these policies, employees legally own the account; the higher the contribution, the higher the future pension an individual will receive. These policies are a type of guarantee from the central government to owners of individual accounts for their future pensions. If these rules are to be credible, they should also guarantee the repayment of any 'borrowing' by the local government from individual accounts.

The concern about empty accounts is really a concern about the management of pension funds. Since the pension reforms, pension funds in China have been managed by the so-called social security fund agency[15], which is an agency of the Ministry of Labour and Social Security (MOLSS). This agency is responsible for collecting contributions and for the daily management of pension funds, including funds in individual accounts and for paying pensions (Liu 2000). Since pension funds can only be used to buy government bonds or deposits in state-owned banks (Han and Jiao 1997), there are no private, independent fund managers to manage investment of pension funds. On the one hand, the local MOLSS agency is supposed to manage pension funds under the central government's policies. On the other hand, jobs and promotions for people working in

[14] Assuming the return is the same as the market return.
[15] Since 1998, local government treasury also took part in pension fund management, responsible for paying out pensions from a special pension funds account into the local agency of MOLSS.

these agencies are usually controlled by the local government. As a result, it appears that funds are often used outside the scope prescribed by the central government guidelines (Han and Jiao 1997).

The central issue of the notional account problem in the Chinese pension scheme is about management policies for the accounts. While the principle of private ownership of individual accounts is clear, other relevant rules of fund management are insufficient to protect such ownership. This management problem could lead to a result where money 'borrowed' from individual accounts cannot be repaid back when these individuals retire. If that time comes, either of two things may happen, or both may happen: (1) The local government has to raise taxes or reduce expenditures, or the central government will have to bail out provincial governments, in order to keep the scheme running; or (2) Retirees will receive less than they were promised. In case (1), the government will have to impose more taxes on the private economy; this would change the nature of the supposedly funded scheme to one that is essentially PAYGO, but with individual accounts. In case (2), the supposedly individual accounts will turn out not to have been genuinely individual accounts.

7.3.3.3 The Partially Funded System

The present Chinese pension system is called a 'partially funded' system, which means that part of the pension scheme is financed as a PAYGO scheme. The elementary pension, which is part of the basic pensions provided by the system, operates under such a scheme. 17 per cent of wages are contributed by employers into a social pooling fund, at the (targeted) province level, to pay a flat-rate pension, equals to 20% of the local average wage, to all retirees with more than 15 years of contribution. The main argument for the flat-rate elementary pension is that the public pension scheme should provide a basic living for all retirees (Han and Jiao 1997).

This feature imposes a payroll tax on workers. As discussed in part 2 of this chapter, given the flat rate contributions, the social pooling of pension funds tax the rich to subsidize the poor. It is easy to see that the social pooling finances a progressive redistribution among participants of the scheme, since a pension of a given amount per month, that is, the flat rate elementary pension, is a bigger percentage of the income of a

poor person than of a rich person. Moreover, as discussed in 7.3.3.2, the social pooling even imposes excess taxes in the form of excess contributions on workers who earn the local average wages, since the government uses pooling funds to pay its pension liabilities accumulated in the old PAYGO scheme.

The main support for the social pooling is that it provides support for poor retirees. However, there are three other issues with regard to this current arrangement. The first is whether it is necessary to have a safety net within the public pension scheme, given that there is already a social safety net in urban China. As discussed in Chapter 5, the UMLS program provides a guaranteed minimum income for all city residents, financed by general revenues of the city government. It is not clear why there is the need for a separate safety net for retirees within the public pension scheme.

Secondly, there is the question that whether the social pooling is fair. Since only employees with at least 15 years of contribution can get the elementary pension, this means that workers who contribute for long period but for less than 15 years loss all their contributions into the social pool, which is 17 per cent of their wages. In reality, people with relatively short periods of contribution may well be the group that most need the government's assistance, since their lifetime income may be low, due to short periods of employment. The income redistribution through the current social pooling misses the group who are more likely to be really poor.

The third issue is whether the social pooling can deal with the population-aging problem in China (Han and Jiao 1997). It is easy to see that the contribution rate, 17%, for the social pooling is too high to finance a flat rate pension of 20% of average wages. Discussions in Chapter 4 show that in fact, this arrangement can support a very 'old' population covered by this PAYGO scheme. The program breaks even when the retiree/employee ratio of participants is as high as 85%, which means roughly every five employees support four retirees. So, this scaled-down PAYGO program appears to be over-prepared for population aging in the long run. In the short run, however, this PAYGO program does not provide sufficient funds to pay government's pension debt of the old PAYGO scheme. According to official figures, in the first year of the pension reform, 1997, when participants of the program were mainly SOEs, funds collected by the social pooling were not sufficient to pay pensions that year, since the ratio of

pensions to payroll for all urban work units was 21%[16]. This ratio was higher for SOEs, but was much lower for work units that were not publicly owned.

It seems that the government uses the overfunding for the potential long run problem of population aging to help financing its problem of pension debts in the short run. The outcome of this strategy is that the current pension program includes a very high tax component, as discussed in this chapter. In the meantime, due to the shortfall of funds in the social pool to pay current pensions, some local governments use funds in individual accounts, and the central government has also stood ready to bail out some local governments. 'Between 1997 and 2000, subsidies doubled every year? from over 5 billion yuan in 1997 to over 10 billion in 1998, over 20 billion in 1999, and over 40 billion in 2000' (Zhao and Xu 2002: 404). In 2001, the subsidy was again 40 billion yuan (Zhao and Xu 2002).

7.3.4 An Alternative Approach to Finance the Pension Debt of the Chinese Pension Reform

The main reason that the Chinese government chooses to have a scaled-down PAYGO component in the post-reform pension scheme is to provide some kind of mechanism to help (partially) finance the accumulated pension debt of the old PAYGO scheme (Han and Jiao 1997). However, the problems that this component has caused actually overweight the benefits it may bring of financing the pension debts[17].

For a given economy, transition costs depend upon factors such as the coverage and rules of pension benefits in the old PAYGO system, the age structure of the population covered, as well as whether the new system is fully or partially funded. The transition costs in China are estimated to be relatively low, compared with those in countries such as Chile and Argentina, when they reformed their systems (World Bank 1997)[18]. Indeed, as shown in Table 7-5, for most years between 1985 and 1999, pension payments were only about 2 per cent of GDP in China.

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[16] The ratio is 19% and 22%, in 1996 and 1998, respectively. Source: Author's calculation based on SSB (2000a).

[17] For the explanation of pension debts/transition costs of pension reform, see Chapter 6.

[18] The World Bank estimates that the implicit pension debt in China in 1994 was about 46-69% of GDP that year. Compared with 100-200% in most OECD countries, 40-130% in Chile (depending on the discount rate chosen), the implicit pension debt in China is not very high. See the World Bank (1997).

Our discussions show that the Chinese government has not dealt with the transition costs explicitly. So far, pension reforms have attempted to finance much of this cost within the new pension system. For example, the reform increased pension fund revenues by adding employee contributions in the early 1990s; and pension entitlements have been reduced by promising lower replacement rates. The reform is also aiming at expanding the coverage of the scheme to all urban employees, so that the relatively young labour force in the non-public sector can reduce the relatively high system dependency ratio (the ratio of number of retirees to the number of workers) in the public sector (see Chapter 4). More importantly, the reform attempted to reduce the entire 'transition cost problem' by moving to a partially funded, rather than a fully funded system, using the social pooling funds to pay pension debts accumulated in the old PAYGO scheme.

Despite these efforts to reduce public pension liabilities and to increase revenues, there are no policies specifying where necessary funds would come from to pay pensions to current and future retirees who have contributed in the old PAYGO scheme for the whole or part of the period of their employment. The lack of explicit funding for the public pension debt has led to various problems in practice, such as those discussed in this chapter.

Financing the transition costs is an issue that the government has to deal with when the public pension system is transferred from a PAYGO scheme to a funded one. Due to the scale of the debt, the costs are usually expected to be financed over time, perhaps even over a few generations. This is not only fair for the first generation of the new funded system, but is also an economically efficient approach. As discussed in Chapter 6, the cost-minimizing path of financing a given government debt is to spread the tax burden over time. A second argument for not financing the transition costs of switching to a fully funded scheme out of current tax revenue is that in a transition economy, such as China, the tax system is not yet efficient nor well developed. For both these reasons, bond financing should be the major option for the transition costs for some period ahead. This includes borrowing from accumulated pension funds to pay current pensions. As discussed previously, the key issue is not whether funds in individual accounts can be used to pay government pension liabilities (transition costs of pension reform), but how and on what terms the borrowing occurs. Relevant policies should

respect and protect private ownership of individual accounts, as well as be transparent and provide good governance for the management of pension funds. If the funds have to be managed by local government departments, they should be subject to auditing and prudential supervision by the central government. As quickly as possible, the management of pension funds should be transferred to credible and independent fund managers, who have the incentive to act on behalf of account owners, but also under appropriated government supervision.

In order to examine the burden of the transition costs as well as the most efficient taxation path to finance them, some simulations are carried out. They are based on the same theoretical and empirical models used for simulations in Chapter 6. In those simulations, the problem is that the government needs to collect payroll taxes to finance the old, defined-benefit, PAYGO pension scheme during the 2001-2050 period. In those cases, the government pension liabilities include both its debt towards those who had been contributing to the scheme up until 2000[19], as well as those that will occur during the 2001-2050 period. In the simulations that follow, the problem is, instead, that the government only needs to collect payroll taxes to finance the accumulated pension debt up until 2000. Obviously the tax rates simulated here to be needed to finance only existing pension liabilities are much lower than those simulated in Chapter 6 to be needed to finance both existing and future pension liabilities. Here, it is assumed that the government plans to repay its implicit pension debt between 2001 and 2050[20]. In addition, there are few other assumptions. (1) It is assumed that the fully funded pension scheme is financially balanced and all pensions paid to retirees of the new scheme are from accumulated contributions, and are not part of government expenditures; (2) It is assumed that pension contributions in the new funded scheme are not perceived as taxes by workers; (3) As in Chapter 6, it is assumed that no other government expenditures are financed by payroll taxes.

Based on the optimal taxation model in Chapter 6, the most efficient way of financing the accumulated pension debt, or the transition costs of pension reforms, is to spread the tax burden over time. So in these simulations, the government's problem is to collect

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[19] In the old Chinese pension scheme, there was no explicit payroll tax for the pension. However, the government had liabilities to pay pensions for all retirees covered by the pension scheme.

[20] This approach repays the pension debt over the 50-year period. The gap between tax revenues and pension payments for individual years can be financed by government bods.

just enough payroll taxes over the 50-year period, so that their present values (in 2000) are equal to the present values (in 2000) of the pension debts. The scale of China's pension debt is estimated to be 50% of GDP in 1996 (in 1996 values) by the World Bank (1997). We use this estimation as the approximation of the accumulated pension debt up until 2000. In the simulations, this pension debt is rescaled into 2000 values. Obviously, this approach of simulation means that the discount rate chosen for future tax revenues matters. In the simulations, several discount rates are used to examine the sensitivity of the results.

In the first set of simulations, it is assumed that the taxation system is inefficient and the inefficiency coefficient[21] is fixed at its value in 2000—7.5% of gross tax revenues. Since the optimal taxation rule smoothes out tax burden over time, it is expected that the optimal tax rate is constant over time. The simulations examine the three cases of economy growth during the 50-year period, as shown in Table 6-4 of Chapter 6. When the economy grows at a different rate, the taxation bases vary. The higher the growth rate of GDP per capita is, the higher the growth rate of wages and therefore the larger the taxation base is. So, to finance the given amount of initial government pension debt, a lower tax rate is required on payroll.

The results in Table 7-6 show that the tax rate reduces when the economy grows faster in terms of GDP per capita. When the discount rate is 5%, the required tax rate is 3.8% during the 50-year period when GDP per capita grows at 3% per year. The tax rate drops to 2.6% and 1.7%, respectively, when GDP per capita grows at 4.5%/year and 6%/year. Changes of discount rate do not affect this pattern, although, when the discount rate is higher, a higher tax rate is needed to finance the pension debt. For instance, when the discount rate is 7%/year, the tax rate required is simulated at 5.9%, 4.3% and 3.0%, when GDP per capita grows at 3%/year, 4.5%/year, and 6%/year, respectively. As the results show, so long as the economy remains to grow relatively fast, say GDP per capita grows at 6%/year, the tax burden for financing pension debt remains at a low level of equal or less than 3% per year, for the various values of discount rate chosen for the simulations.

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[21] This is defined as that in Chapter 6: the coefficient, α, is the proportion of tax revenues wasted and therefore can not be used to pay government liabilities.

When the taxation system becomes more efficient over time, the optimal tax rate is expected to rise, since it reduces the overall deadweight losses if a lower tax rate is imposed when the taxation system is less efficient while a higher tax rate is imposed when the system is more efficient. The tax burden of financing the pension debts are expected to be lower due to less waste of tax revenues. Simulations are carried out for the three cases of economic growth and when the discount rate is chosen to be 5%/yr. It is now assumed that the inefficiency coefficient of the taxation system declines at the same rate as the growth rate of GDP per capita.

The results are drawn in Figure 7-7. There are three observations from this figure: (1) With an increasingly efficient taxation system, the optimal tax rate required to repay pension debts is lower, compared with the case when the system remains inefficient. For instance, when GDP per capita grows at 6%/year, the optimal tax rate rises from 1.5% in 2001 to 1.6% in 2050, while it is 1.7% if the taxation system remains as inefficient as it was in 2000 (see Table 7-6). (2) It is confirmed that to collect the revenues in the most efficient way, the tax rate should increases over time; For instance, when GDP per capita grows at 4.5%/year, the optimal tax rate starts from 2.4% in 2001 and rises to 2.5% in 2050. (3) The faster the economy grows, the lower the tax rate is needed to pay the pension debts. This is the same result as in the case when the efficiency of the taxation system is not improved (see Table 7-6). When GDP per capita grows at 3%/year, the tax rate starts from 3.5% in 2001 and rises to 3.8% in 2050; while when GDP per capita grows at 6%/years, the tax rate begins from as low as 1.5% in 2001 and only rises to 1.6% in 2050.

The simulation results show that for the pension debts that are of the scale of 50% of Chinese GDP in 1996, the payroll tax rate required to finance the debts over the 50-year period is quite low and thus affordable. The tax rate is especially low when the taxation system in China becomes more efficient over time, and when the urban economy grows at a faster rate. Compare with the high tax rates simulated in Chapter 6 for the PAYGO scheme, these relatively low tax rates also reflect the feature of the Laffer curve: when the tax rate is low, the tax revenue rises fast with the tax rate. When the tax rate is high, the tax revenue rises slowly with the tax rate.

The simulation results also suggest that it is economically efficient for the Chinese government to smooth out the transition costs of the pension reform and to finance them over a long period of time: a higher tax rate for financing the pension debts should be imposed when the taxation system becomes more efficient. Faster economic growth helps to reduce the tax burden of the transition costs.

7.4 Conclusions

This chapter is the second of two chapters that examine the options of future pension scheme in China in the context of population aging and economic transition. This chapter has looked at two major issues. The first is the taxation implications of a funded public pension scheme on individual contributors, on the assumption that labour supply is inelastic. The focus has been on a fully funded pension scheme that uses individual accounts to accumulate funds versus a funded one that uses a social pooling.

The taxation impact of a fully funded public pension scheme with individual account is summarized in Table 7-1. The main result is: when the private savings constraint is not binding, the scheme does nothing if the return on pension funds is equal to the market return on private savings. However, when the private savings constraint is binding, the public pension scheme works as an implicit subsidy to savings. As a result, total savings rise. For a funded pension scheme that uses social pooling, the social pool simply taxes the rich to subsidize the poor, by redistributing pension contributions.

A simple extension of the above analysis looks at the aggregate implication of a public pension scheme on the economy by using the PPF curves. It is found that, when the private savings constraint is binding, a public pension scheme with mandatory savings reduces consumption in the present period but increases it in the future period. When increasing domestic savings reduces the domestic interest rate, financing the same level of consumption for future retirement would require lower consumption during the present period than other wise it would be.

The rest of this chapter comments on the major reforms of the Chinese pension system during the 1980s and 1990s, with the focus on why these reform choices were made and what are the possible economic implications of these reforms. The analysis shows that

using individual accounts to accumulate pension funds has the potential to reduce the taxation impact of the scheme. However, there are problems that the current scheme has failed to address, and there is room for the system to improve.

Firstly, this partially-funded scheme has failed to explicitly address the issue of the accumulated pension debt of the old PAYGO scheme. It appears that the government has mainly tried to finance the cost from within the new system, rather than by dealing it separately. This explains the choice of the current partially funded system. The lack of funding during the transition period has led to other problems, including the so-called notional individual accounts. This chapter recommends using government bonds, rather than current tax revenue, as the main source of financing the transition cost, at least in the short run. The simulation results show that suppose the government plans to repay the pension debt accumulated with the old PAYGO pension scheme up to 2000 within the 2001 and 2050 period, the tax burden is quite low. If the scale of the debt is about 50% of GDP in 1996 as estimated by the World Bank (1997), the urban GDP per capita grows at 6%/year, and the taxation system becomes more efficient over time, the tax rate required to finance the transition costs starts as low as 0.6% in 2001 and only rises to 2.9% in 2050. The improved efficiency of the taxation system reduces the tax burden. The most efficient way to collect revenues to pay the pension debt is to impose higher taxes when the taxation system becomes more efficient.

The second issue is regard to the PAYGO component of the current pension scheme. The necessity and effectiveness of pooling has also been discussed and questioned. It is argued that the social pooling is to help generating funds for the government to pay its pension debt. It has a very high taxation component, yet it does not appear to provide assistance to those who are more likely to be poor during their retirement. In particular, the current social pooling within the PAYGO component imposes two types of taxes on workers: the first one is to tax the rich in order to subsidize the poor; the second one is due to its feature of defined benefits. As a result, even workers who earn average wages are taxed, and the longer they contribute to the fund, the higher the tax burden is.

The third issue, which is critical for the success of the Chinese pension reforms, is the management of individual accounts. While there are rules that clarify the ownership and portability of the accounts, it is clear that the current arrangement of fund management

hinders the effectiveness of individual accounts in reducing the taxation burden of mandatory savings. If the government wants to obtain the benefits of individual accounts, employees' ownership of all funds, plus market returns on the funds, must be well defined and protected.

Figure 7-1. An Income Tax on Returns on Savings

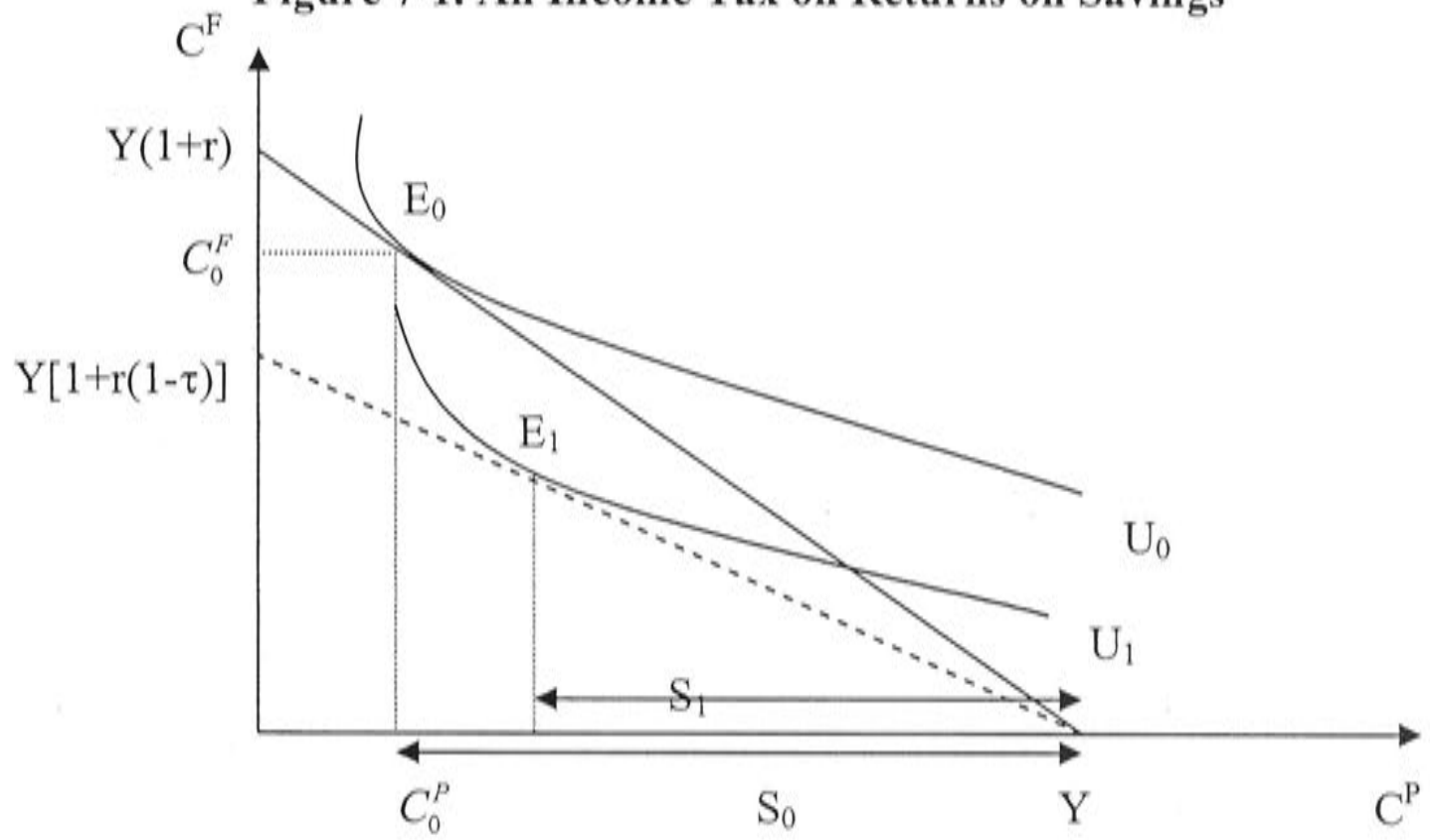


Figure 7-2. The Deadweight Loss of an Income Tax on Return on Savings

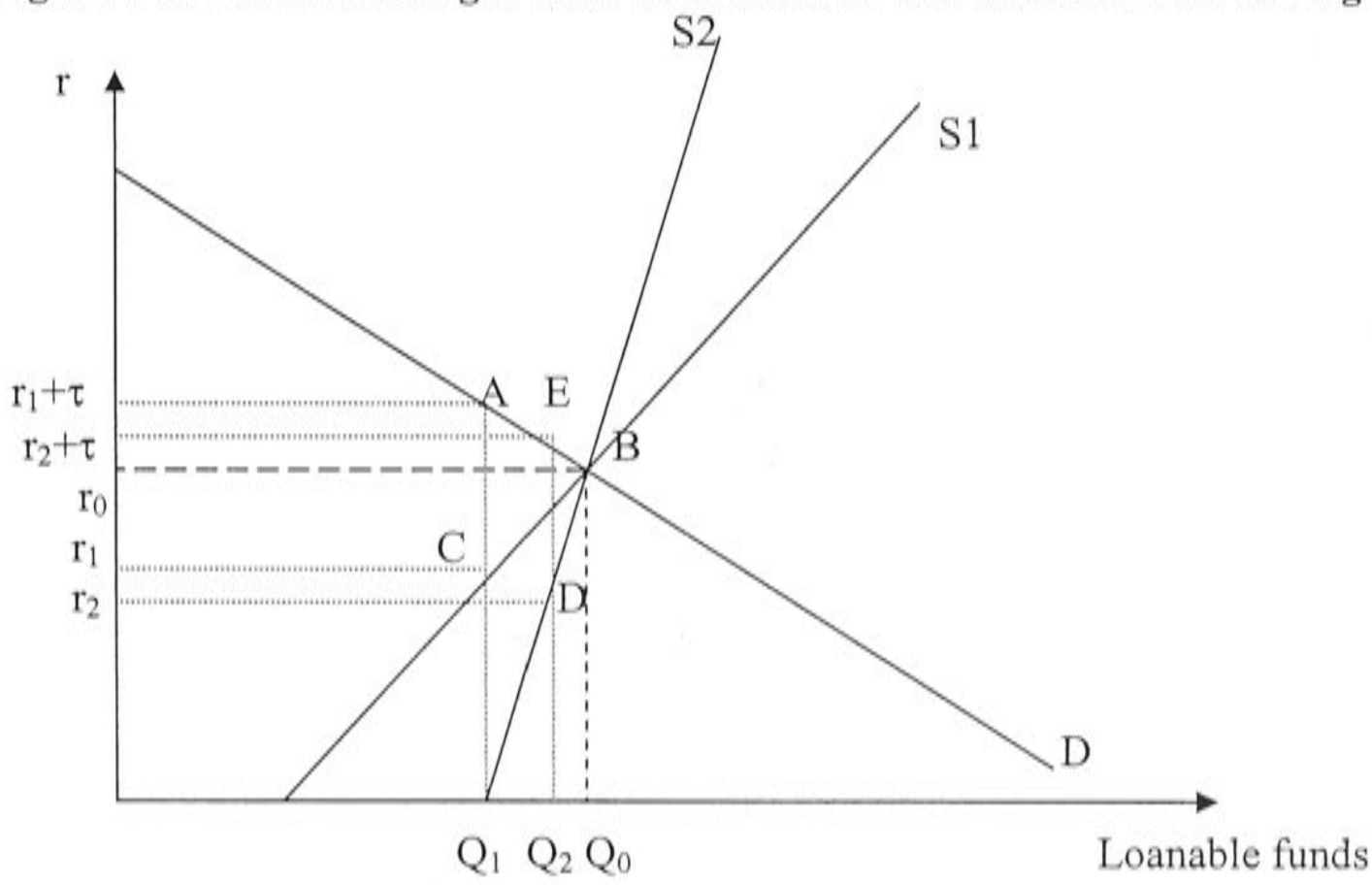


Figure 7-3. The Impact of a Fully Funded Public Pension Scheme on Budget Constraint

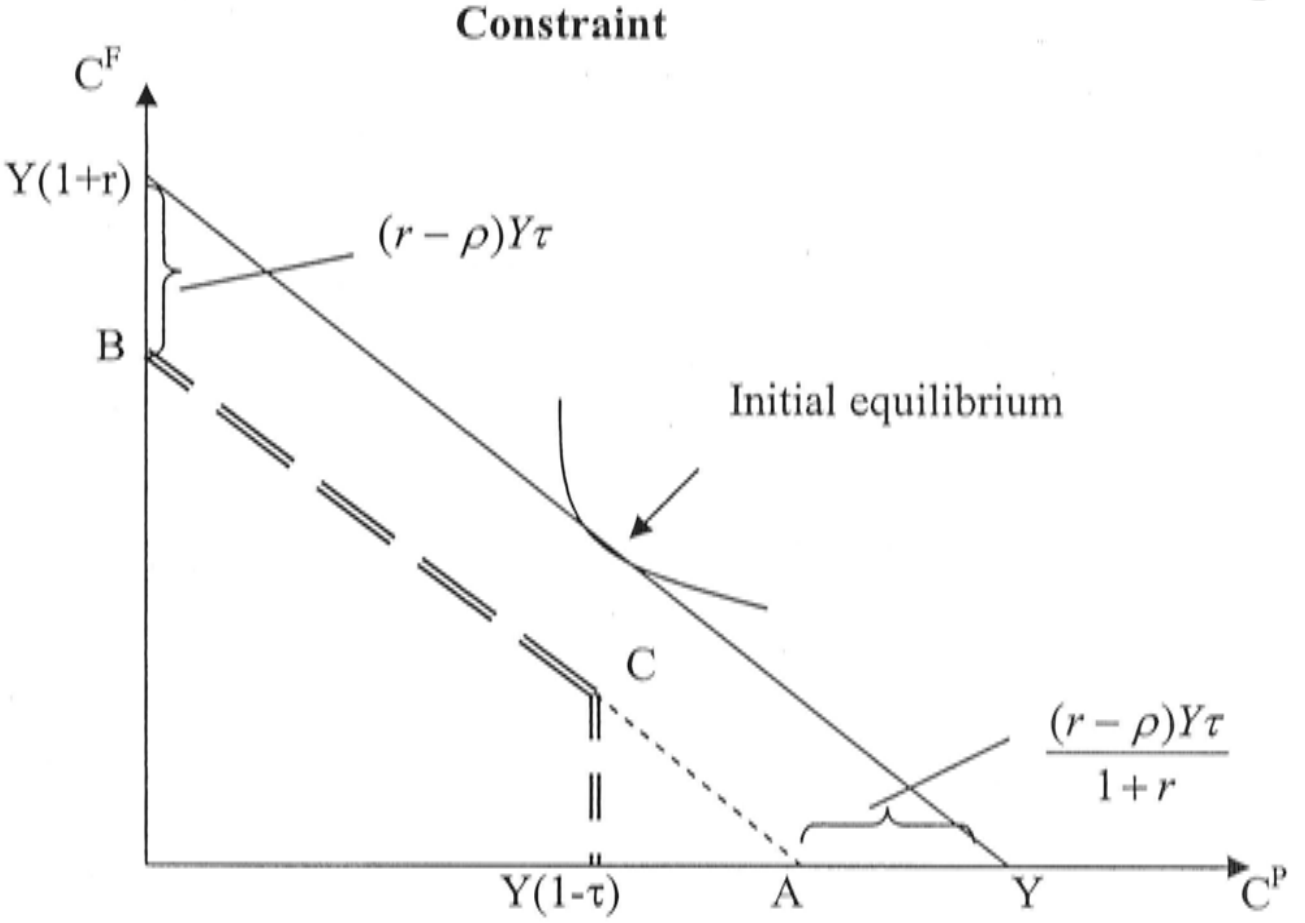


Figure 7-4. The New Equilibrium with the Public Pension Scheme

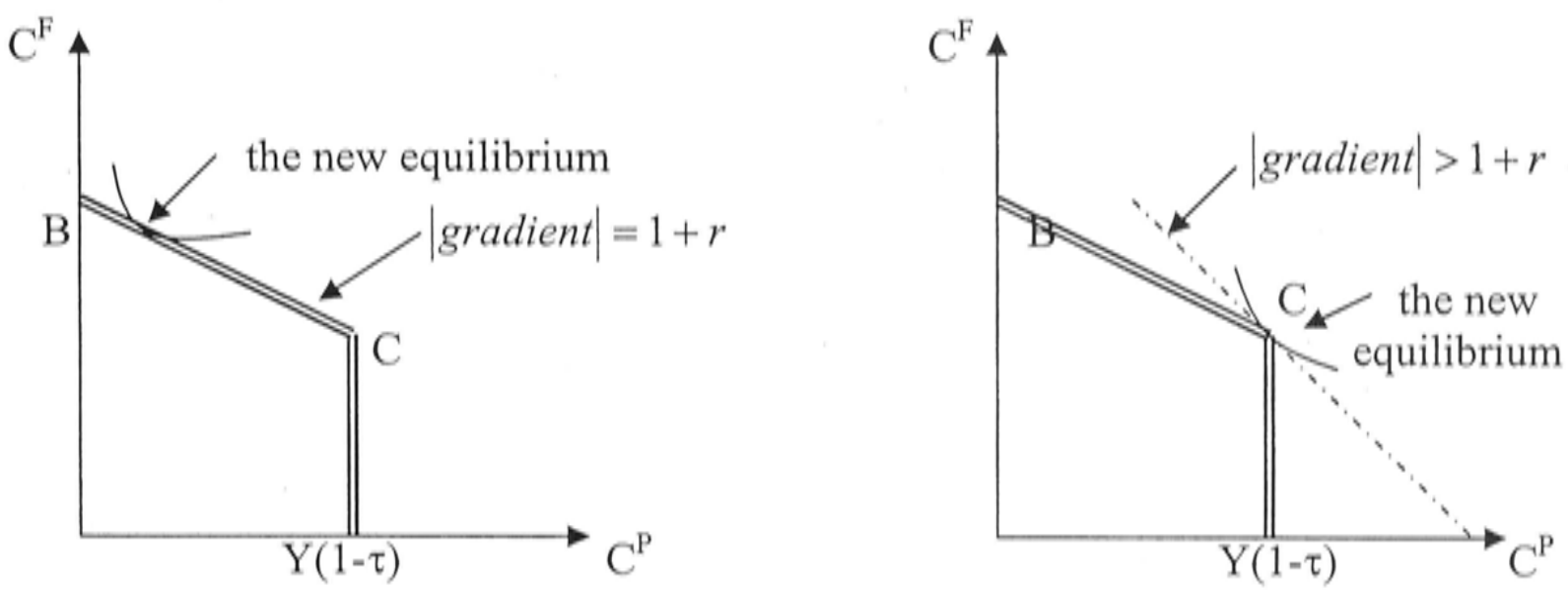


Figure 7-5 A Production Possibility Frontier Analysis of the Impact of the Public Pension Scheme

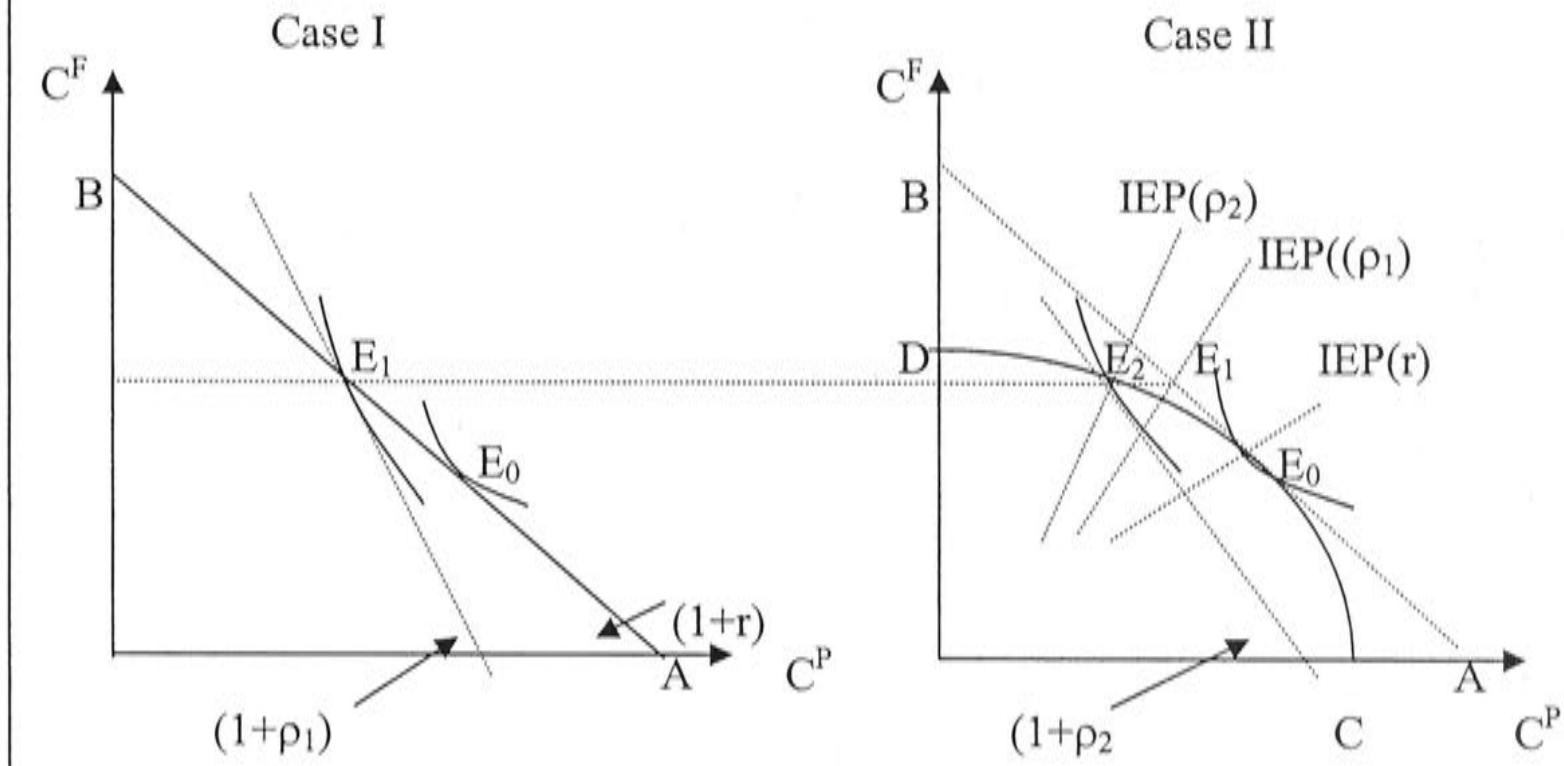
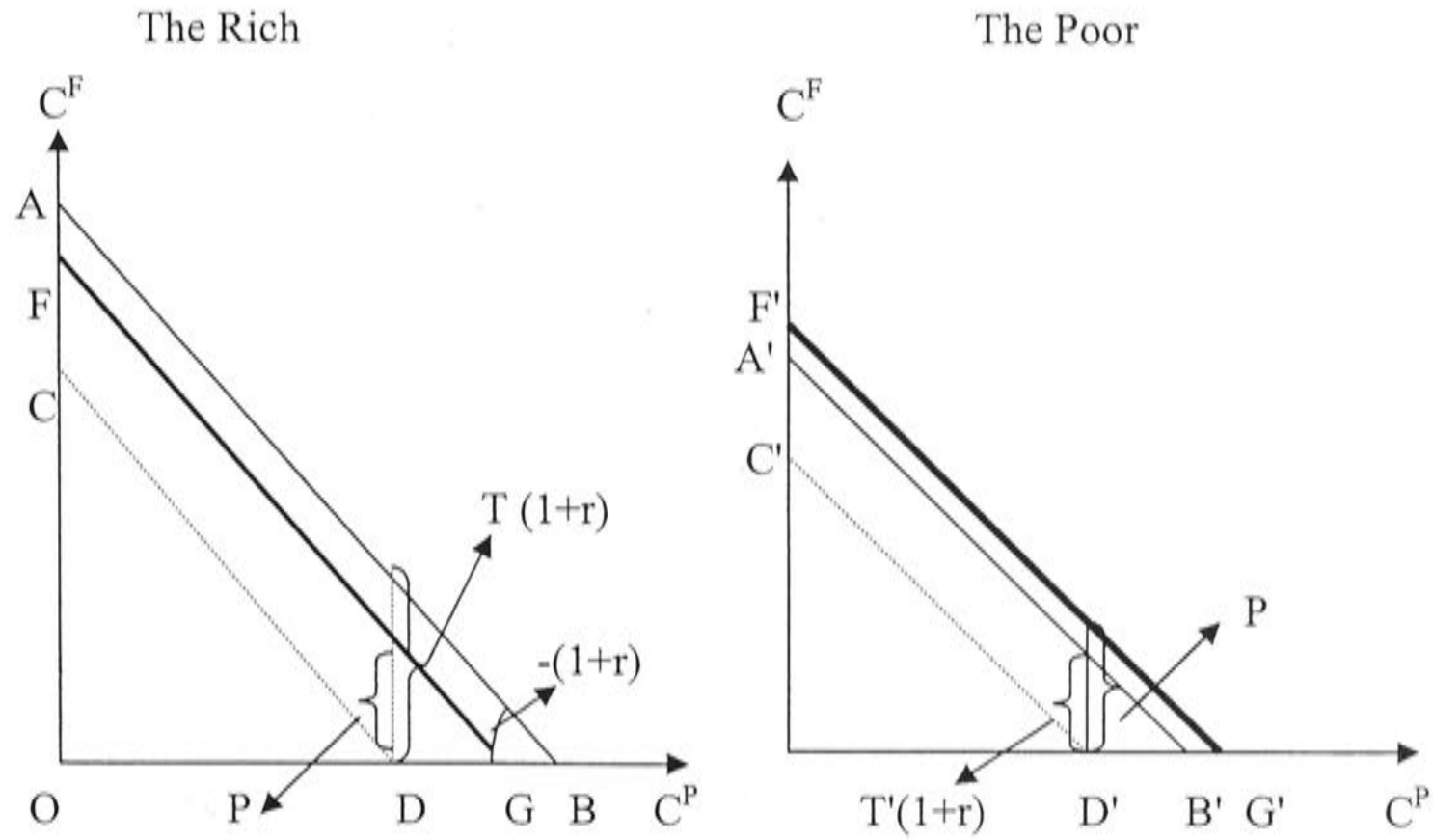
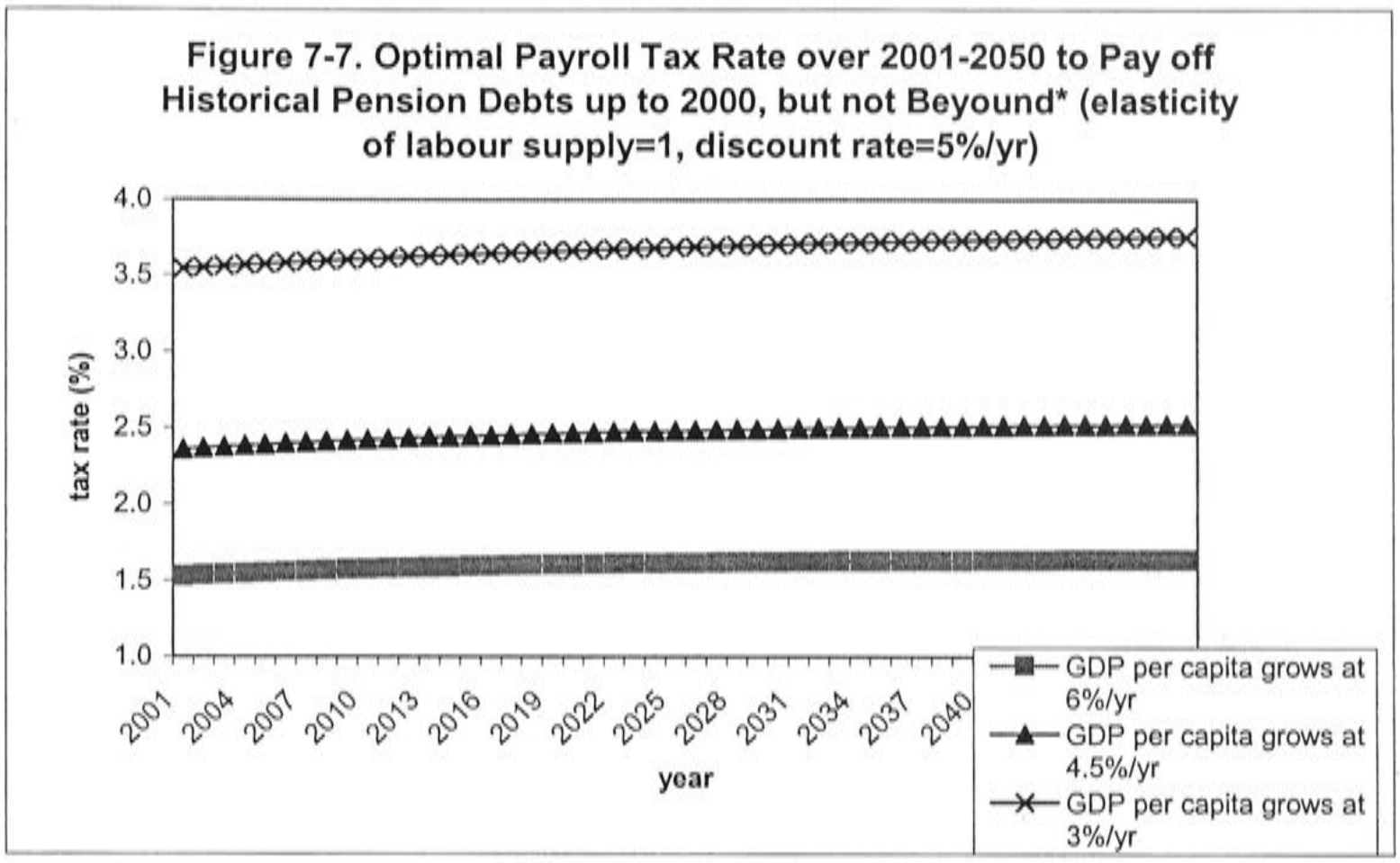


Figure 7-6. A Public Pension Scheme with Social Pooling





No

te: * As explained in the text, this is the optimal tax rate required to collect just enough revenues (in 2000 values) to pay the accumulated pension debt of the old defined-benefit PAYGO scheme.
Source: author's simulation results.

Table 7-1 Taxation Impacts on Individuals Covered by the Public Pension Scheme

	Private savings constraint non-binding	Private savings constraint binding
$\rho = r$	Nil	Subsidy on savings
$\rho > r$	Pure positive income effect	Subsidy on savings
$\rho < r$	Pure negative income effect	Subsidy on savings

Table 7-2. Revenue, Outlay and Surplus of the Old Age Pension Fund in China (billion yuan, 1989 value[a])

Year	Revenue[b]	Outlay	Surplus (at year end)	# of months pension payment of the surplus[c]
1989	14.7	11.9	6.8	6.9
1990	17.7	14.7	9.8	8.0
1991	20.3	16.3	13.8	10.2
1992	31.7	27.9	17.6	7.6
1993	37.5	35.1	20.1	6.9
1994	42.1	39.4	22.8	6.9
1995	48.5	43.3	28.0	7.8
1996	55.0	48.4	34.6	8.6
1997	60.9	56.9	38.5	8.1
1998	51.5	52.2	37.8	8.7
1999	91.1	89.3	39.7	5.3

Notes: a. Urban CPI is used to rescale the nominal value into 1989 constant yuan;
b. The source does not indicate whether the figures include interest on balance or not.
c. The number is calculated using the following formula: (surplus at year end* 12)/ outlay
Source: author's construction based on figures in Table 1-51 and Table 8-26 in SSB (2000a: 66, 475).

Table 7-3. Comparison of Replacement Rate (%)[a] of Alternative Pension Schemes in China

Scheme	PAYGO	Method 1[b] of 1995 reform[d]	Method 2B[cb] of 1995 reform[d]	1997 reform[c]
15 year contribution/service[d]	70	24	40	36.5
20 year contribution/service	75	32	45	40
35 year contribution/service	80	56	60	58.5

Note: a. The replacement rate is defined as the ratio of the first monthly pensions at retirement and the last monthly salary of employment. It is calculated for workers who earn the average wages.

b. Method 1 and 2B are explained in Text Box 4.2 in Chapter 4. The former has contributions rate of about 16% of wages into individual accounts, while the later has contribution rate of about 10% of wages into individual accounts.

c. These replacement rates are approximations, since they include various percentages of the local (municipal or provincial) average wages. In calculating these figures, it is assumed that the interest rate used to accrue interests to pension fund is the same as the growth rate of wages.

d. There was no employee contribution in the old PAYGO system. The replacement rate depended upon the length of service; years of contribution for the schemes of 1995 and 1997 include contribution years from both the employer and the employee.

Source: For the PAYGO system, see Chapter 3. Others are from Han and Jiao (1997) and author's calculations.

Table 7-4 Contributions, Employment and Replacement Rate of Pensions

Years of employment/contribution	Replacement rate[a] of the current Chinese pension scheme (%) (A)	Replacement rate[a] of scheme H (%) (B)	Contribution rate required for the same replacement rate as (A) (%)[d] (C)	The excess contribution rate of the current Chinese pension scheme (percentage points)
10	11[b]	28	11	17
15	36.5[c]	42	24.3	3.7
20	42	56	21	7
25	47.5	70	19	9
30	53	84	17.7	10.3
35	58.5	98	16.7	11.3
40	64	112	16	12

Note: a. replacement rate is calculated as the ratio of the first month (year) pensions to the last month (year) wages of work.

b. Workers with less than 15 years of contribution are not eligible for the 20% local average wage. The number is calculated assuming pensions for the first month of retirement are paid as 1/120 of total funds in the individual account.

c. This and those following replacement rates in column A include 20% of the local average wages.

d. Here, all contributions are accumulated in individual accounts.

Source: author's calculation.

Table 7-5. Public Pension Payments and GDP (billion yuan, current yuan) in China

Year	Pension Payment[a] (1)	GDP (2)	(1)/(2)	Year	Pension Payment (1)	GDP (2)	(1)/(2)
1985	14.6	896.4	0.02	1992	57.9	2663.8	0.02
1986	17.2	1020.2	0.02	1993	75.9	3463.4	0.02
1987	20.8	1196.3	0.02	1994	104.4	4675.9	0.02
1988	27.5	1492.8	0.02	1995	130.6	5847.8	0.02
1989	31.9	1690.9	0.02	1996	155.2	6788.5	0.02
1990	39.6	1854.8	0.02	1997	179.1	7446.3	0.02
1991	46.8	2161.8	0.02	1998	207.4	7834.5	0.03
1992	57.9	2663.8	0.02	1999	242.1	8191.1	0.03

Note: Pension payment is the actual payment of pensions to all eligible retirees. It is used to represent the pension liabilities of the old PAYGO system.
Source: author's calculation based on pension and GDP figures in SSB (1999).

Table 7-6. Simulation Results for the Optimal Tax Rate Required to Finance the Pension Debt in China between 2001 and 2050
(wage elasticity of labour supply is 1, the inefficiency coefficient of the taxation system is 7.5%)

Discount rate (%/year)	5			7			3		
Growth rate of GDP/capita (%/year)	3	4.5	6	3	4.5	6	3	4.5	6
The optimal tax rate for pension debts (%)	3.8	2.6	1.7	5.9	4.3	3.0	2.3	1.5	0.9

Source: author's simulation results

Chapter 8. Conclusions and Policy Implications for Future Reforms of the Chinese Social Security System

The purpose of this study is to understand the origin and the current situation of the social security system in China, so that policy suggestions can be explored for its future reforms. The discussion of its origin reveals some main features of a unique social security system in the socialist China during the command economy era (1949-1978). These features contribute to the necessity for the recent reforms of the system during China's economic transition (1979-2002). As this study shows, further reforms of the social security system are needed, as part of China's transition towards a market-oriented economy.

This thesis intends to put the study of the social security system in a broader context of China's social and economic conditions before and after the economic reform started. Among many aspects of the system, the focus of this study is on the economic efficiency impacts of the system, such as that on labour supply, labour mobility and on private savings. This is an important area for study, particularly for China, which is undergoing the economic transition from a command economy towards a market-based one. The broad review of the pre-reform social security system shows that it had disincentive impacts on Chinese workers and farmers. The discussions of the recent reforms of the system also demonstrate that the designs of the new programs have potential negative impact on labour supply and/or labour mobility, as well as private savings. For future reform policy options, this study uses the old-age pension scheme as a case study. The choice is due to the significance of this scheme in total government expenditures of the social security programs, and the mounting financial pressure expected from population aging. It is expected that the careful analysis of one single program will contribute to further studies of the efficiency aspect of other social security programs, as well as relevant policy implications.

China's economic transition is a complex and dynamic process that is far from completion. Accordingly, the reform of the social security system is a process of learning and improving. Given the space of a thesis, this study does not intend to include all relevant issues of social security reform in China. For example, reforms in areas such as state-owned-enterprise (SOE), labour market, and rural-urban migration,

are treated as background, rather than careful analyses. However, this study is a relatively comprehensive research of the Chinese social security system from its origin to its recent reform progress that covers most programs of the system[1]. Examining details of the programs while putting the whole system in the broader economic and social context—from a command economy to a transition economy—also puts the study of the social security system reform in perspective.

The main results of this study are summarized in Section 8.1. This is followed in Section 8.2 by some policy implications for future reforms, particularly that of the pension scheme.

8.1 Main Conclusions from the Study

The pressure for social security reform in China comes from the origin of the system as well as from recent economic and demographic transitions that will remain for several decades ahead. Chapters 2 and 3 review the origin of the social security system in communist China. It is shown that the system was composed of two separately operated, yet financially linked, systems in rural and urban China. In an economy that was centrally planned, and in which resources were allocated by the government instead of by the market, the pursuit of rapid industrialization in an agriculture-dominated economy led to large scale off-budget taxation on the agriculture sector to cross subsidize the industrial sector. Along with other reasons[2], this development strategy led to the most important feature of the Chinese social security system during the pre-reform period: that it was a dual-system that was composed of a fairly primitive, mainly community-based system in villages, and a much more generous system in cities. The generosity of the latter was at the sacrifice of the former. This dual-system is studied separately in Chapter 2 and 3.

The social security system in rural China before 1978 was formed mainly after the Great Famine (1959-1961). As a result of lessons learned from this tragedy, the system emphasised the provision of basic food grain by the lowest level of the People's Commune? the production team. The Commune system was established by the central

[1] Programs that are not included are such as free education in cities and the community-based provision of primary eduction in villages before the economic reform.

government to facilitate its rapid industrialisation development strategy. On the one hand, the People's Commune was the lowest level of government that carried out government's policies. On the other hand, the Commune was the organizer and manager of agricultural production, which was conducted by the production brigades and the production teams. The team and the brigade were also responsible for the administration and funding of the major social security programs, such as the provision of a minimum allocation of food grains to poor members, support for the lone elderly, and the provision of a basic medical care system. Since the team was essentially based on rural neighbourhood community, while the brigade was based on natural villages, these social security programs were essentially community-based. There were some social security programs provided by the state, but they were only available when the problem was too large to be dealt with within the Commune system.

Social security programs are often part of income redistribution by the government to support people in need of the society. Chapter 2 examines the income distribution process in the agricultural sector during the pre-reform period. It is found that firstly, a large proportion of agricultural products were explicitly or implicitly taxed by the central government. Then funds were allocated for the provision of social security programs within the collectives. Finally, the labour income of team members was distributed as the residual. Obviously, this sequence of income distribution was in line with the rapid industrialisation strategy. That is, the agricultural sector had to be a net contributor to the national economy, while providing a minimum subsistence to every team members. It is found that taxes on agriculture were so high that collectives often struggled to provide subsistence to all their members, let alone to reward hard works of individual farmers. As a result, there was a lack of incentives for farmers and agricultural production stagnated.

With the cross-subsidies from the agriculture sector, the urban residents in China could enjoy much more generous social security benefits. The core of the urban social security system before 1978 was the Labour Insurance Regulations (LIR), which applied to employees in SOEs. Similar programs applied to other state-owned work units and large collective firms. The LIR was financed and operated at the work unit

[2] Some of the reasons are discussed in the Introduction to this study.

level[3], but was supported by the central government's general revenues. The LIR provided a comprehensive 'cradle to grave' safety net with very generous benefits that covered both employees and their families. This safety net covered the majority of urban residents[4] due to the following reasons: 1) the government adopted the full employment policy to provide jobs for all legal urban residents of working age; 2) the state-owned work units and the large collective firms dominated the urban economy and the employment; and 3) the benefits were extended to employees' family members.

In addition to the formal programs in the LIR, the state-owned work units provided a wide range of fringe benefits and welfare benefits to employees. These benefits were often important services and were of great value to employees. Together, the formal social welfare programs and these informal benefits guaranteed a (relatively) comfortable life for urban employees and their families.

How could this dual welfare system co-exist in China during the 1949 and 1978 period, given the large gap of welfare benefits between cities and villages? This was explored as a part of Chapter 3. It is found that government policies, especially the household registration system (HRS), the People's Commune system, rationing of consumption goods, and restrictions on travel, all contributed to the segregation of the economy between villages and cities. They effectively curbed labour mobility, especially between rural and urban areas.

Overall, the review shows that the dual-system of social security programs were the outcome of the central government development strategies at the time. The administration and funding of these programs were based on the features of the economic system of a command economy. The system taxed farmers heavily. It had strong disincentive effects on labour supply, especially of farmers, and this contributed to the stagnation of agriculture production. Even the urban system that was generous towards employees of SOEs had disincentive impact. This was due to the lack of linkage between welfare benefits and labour contributions by workers.

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[3] This was the case by the time the economic reform started in 1978. Earlier practice of the LIR involved some social pooling of funds from individual work units.
[4] These were those who had the urban household registrations.

This social security system was bound to encounter lots of problems during China's economic transition towards a market economy. In rural China, the old, community-based social security system collapsed when the collectives were dismantled during the early 1980s. Since then, every farmer has had access to land, as well as to the market to sell the produce. The government regards the access to land as the social safety net provided to farmers (Wen 2000). The impact of the collapse of the primitive rural social security provisions on farmers is out of the scope of this study.

The problems of the old social security system in China were the most acute with its urban programs, which only cover residents in cities who have the local urban household registration and used to provide very generous benefits. This is because these programs were heavily relied on the cross-subsidies from the agricultural sector, through the state government revenues. Chapters 4 and 5 examine some of these problems and the government's responses to them. Many of the problems appeared to involve the financial viability and sustainability of the social security programs specified in the LIR. These problems occurred partly due to the fact that the LIR programs were based on individual work units, while the reforms had made SOEs more independent of the government's budgetary support. More fundamentally, there was also the fact that the government had changed its development strategy to increasingly rely on market and had given up much of its power of allocating resources. In addition to these economic transition factors, China is also facing a demographic transition that leads to rapid population aging. The government's response was to deal with the immediate financial pressure on the LIR programs and to reform the major programs of the LIR. The most dramatic reforms occurred in the public pension scheme. The study of the old-age pension scheme in Chapter 4 finds that these reforms appear to be in the right direction as they attempt to establish a link between benefits and contributions. However, they are piecemeal and incomplete, and therefore further reforms are needed to have a fully efficient social security system.

The other type of problem of the old urban social security system was that it could not meet the new demand for social safety in a market-based economy. The government's response was to establish two major social security programs to meet these demands: the unemployment insurance program (in Chapter 4) and the urban minimum living security (UMLS) program (Chapter 5). The study of the former shows that the tax rate

to finance the program was made relatively high to collect revenues to help the large number of laid-off workers from SOEs. The study also raises concerns with regard to the management level of the program, and its possible negative impact on labour mobility. The UMLS program was established in late 1990s to provide a minimum guaranteed income for all urban residents who have the local urban household registration. Due to data limitations, the assessment of this program is at the aggregate level and is preliminary. The results show that during the first few years' of operation, the program extended its coverage and helped an increasing number of poor people with urban registration. The empirical test shows that the UMLS levels varied significantly from city to city, but it appeared to reflect differences of local living costs and income disparity between cities. The UMLS standard was constrained by government's budgetary revenues, although only by a small amount. The major concerns with the UMLS program include two issues: 1) the program is distorting, since it imposes a marginal tax rate up to 100% on earned income of recipients. This distorting tax rate varies depending on the local minimum wage, the availability of part-time jobs as well as the level of the UMLS line. It is recommended that more careful empirical studies are needed to examine the impact on labour supply, especially in rich cities. This feature may become more of a problem with economic growth and the increase of the UMLS standard; 2) the limited coverage of this program potentially hinders labour mobility and thus poverty reduction. The UMLS program operates at the city level. It excludes migrants. Those who are registered as urban residents of other cities have to make their claims to municipal government of their household registration. Rural migrants in cities —those who do not have the urban registration—are excluded from this safety net, even though they are often among the poorest group in cities. Recent studies show that as many as 1 in 5 people who now live in Chines cities belong to this migrant group. This limited coverage of the program potentially hinders labour mobility: it increases the costs of exploring better economic opportunities in other regions, both for urban and rural residents. This in turn reduces the chance of poor people lifting themselves out of poverty by pursuing better usage of their labour. Due to the limited space of the thesis, Chapter 5 does not include a careful analysis of how to deal with these issues. Instead, it points to some possible choices for the improvement of the UMLS program.

The review of recent social security reforms in urban China shows that urban people—those with urban household registrations—are the focus of the new system.

Consider the significant gap between rural and urban income (Zhao, Li et al. 1999), and the restriction of the household registration system on labour mobility, the current social security system in China is, still, effectively a system that is biased towards legal urban residents, who are often the relatively rich in the society. The efficiency impact of such a system is certainly worth studying. However, this thesis, instead, focuses on the urban social security program that is facing the most imminent pressure—the old-age pension scheme.

The pension scheme has particular importance in social security reforms in China, not only because it is the largest program in terms of expenses, but also because China, as a developing county, is facing a massive demographic transition—population aging—that is more typical of advanced industrialised nations (Peterson, 1999). Economic transition also adds complexity to this issue.

This thesis studies some policy options for the Chinese pension reform during the next 50 years or so, from the economic efficiency point of view, in Chapters 6 and 7. Chapter 6 examines how to smooth the fiscal burden over time.

A simple analytical model based on Barro's (1979) framework is established, and the optimal taxation path is solved. At the theoretical level, the model retains Barro's result that the optimal tax rate is time invariant, so long as Barro's key assumption is satisfied. Furthermore, to capture the economic transition feature of the Chinese economy, an economic transition factor—the inefficiency coefficient of the taxation system is incorporated into the model. The result shows that the optimal tax rate should increase over time when the taxation system of the transition economy becomes more efficient.

At the empirical level, simulations are carried out to examine the impact of population aging on a defined-benefit pension scheme in urban China for the 50 years between 2001 and 2050. The results confirm that population aging, such as that projected by the UN (2001), would impose a rapidly increasing tax burden on workers if the defined benefit, PAYGO scheme were to remain. In the baseline scenario, the year-by-year (or PAYGO) payroll tax rate rises from about 13% in 2001 to 53% in 2050, assuming the

taxation system is efficient[5]. The tax burden gets worse if the population aging in cites is faster than that in villages, and when the taxation system is inefficient. The simulations then examine the alternative option to finance the pre-determined public pension liabilities? the optimal taxation path, which is constant under Barro's assumptions but rises if the efficiency of the taxation system rises. This approach of smoothing out the rising tax burden over time minimises the deadweight losses of financing public pension liabilities during a period of time. From the society's point of view, there are significant efficiency gains to follow this optimal tax path instead of the PAYGO tax path. These efficiency gains are affected by the growth rate of per capita GDP, the elasticity of labour supply, as well as the speed of population aging in cities. In the cases where the taxation system becomes more efficient over time, the optimal tax rate increases. The efficiency gains, however, may increase or drop, depending on the values of parameters. In most of the cases simulated, even the optimal payroll tax rate is above 30% for the period between 2001 and 2050.

These simulation results suggest that with the rapid population aging in China, a defined-benefit PAYGO pension scheme will have to impose an increasing and unrealistically high tax burden on workers. Financed on a year-by-year bases, the PAYGO payroll tax rate rises from 13% in 2001 to 53% in 2005, when the taxation system is efficient, and the urban population aging is as fast as that in villages. In cases when the taxation system is not efficient, and/or the urban population aging is faster than that in villages, the tax rate requited to finance the defined-benefits, PAYGO pension scheme is even higher. For example, the payroll tax has to increase from 16% in 2001 to 66% in 2050, when the taxation system is inefficient (but becomes more efficient), and urban population aging is 10% higher than that in villages.

The alternative optimal tax path approach accumulates funds when the population is relatively young. This smoothes out the tax burden and therefore reduces the deadweight losses. Despite the efficiency gains, the optimal payroll tax rate to finance pension payment would have to be 30% or more. This does not appear to be a feasible rate for a payroll tax.

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[5] Efficiency is defined in terms of the ratio of collection costs to revenues that are used to finance government expenses. In the simulation, an efficient taxation system allows the government to use 100%

These results show that either the Chinese government needs to consider sources other than payroll tax to finance pension liabilities, or to reform the old pension scheme. The question fro Chapter 7 is: is the current, partially funded pension scheme a good choice?

Details of the impact on individual incentives and efficiency of two funded pension schemes—one with funds accumulated in individual accounts and the other one with funds pooled—are discussed in Chapter 7. These analytical tools are used to examine the reforms of the pension scheme in urban China during the 1980s and 1990s. The discussions show that the current scheme has moved away from the old, PAYGO scheme to deal with population aging. However, the government attempts to finance the accumulated pension debt of the old PAYGO pension scheme within the new pension scheme. This has contributed to the decision of retaining a PAYGO component in the new scheme. This PAYGO component has the potential to and has indeed generated a high tax burden on workers. Our simulations in Chapter 7 show that the estimated payroll tax rate during the 2001 and 2050 to finance the accumulated pension debt of the old scheme up until 2000 period is between 1.5% and 3.8%, depending on the discount rate as well as the growth rate of GDP per capita. These results indicate that if the Chinese government chooses to finance the pension debt explicitly, the tax rates required are fairly low. This could remove the pressure to retain the PAYGO component in the new scheme, which generates high tax burden on workers, especially poor workers. Discussions in Chapter 7 also examine the possible disincentive impact of the current management of individual accounts.

8.2 Policy Implications for Future Reforms of the Public Pension Scheme in China

Discussions of the old Chinese social security system and its recent reforms indicate that there are many issues that are needed to be explored in order to improve the economic efficiency of the current system. For instance, the very high marginal tax rate of the UMLS program discourages labour supply, and its restricted coverage can potentially hinder labour mobility. However, since this study has focused on the old-age pension scheme, more explicit policy implications with regard to the best future pension

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of tax revenues to pay its pension liabilities. See Section 6.4.1 in Chapter 6.

reform policies emerge from the careful analyses of this program, particularity those in Chapters 6 and 7.

First, the key issue of the public pension reform in urban China is the rapid population aging. The simulation results show that the projected speed of population aging in China is expected to create such a financial pressure on the old, defined-benefit PAYGO scheme that the payroll tax has to rise to an unrealistically high level by 2050. The high payroll tax rate generates deadweight losses to the economy. Even when the optimal tax rate—the tax rate that smoothes out the tax burden over time—is applied, the payroll tax rate is still too high to be feasible. In most of the cases simulated, the optimal tax rate is about 30%. The problem becomes more acute when the population covered by the scheme is aging faster[6].

The clear message from these simulation results is that the old, defined-benefit PAYGO scheme in urban China must be reformed. Accumulating funds while the population is relatively young by following the optimal tax approach is not feasible either. Transferring the PAYGO scheme to a fully funded scheme with individual accounts is one of the options that many countries have chosen (Peterson 1999). The Chinese government has begun its pension reform in the 1980s and has established a partially funded scheme. This reform is inevitable. However, is this partially funded scheme the right way to go for China? Results of this thesis show that this is not the best reform option for China.

The major problem of this partially funded scheme is with the social pooling of pension funds. The government has retained the social pool as a way to finance the implicit pension debt of the old PAYGO scheme, or the so-called 'transition costs' of the pension reform. Discussions in Chapter 7 show that in China the social pooling of pension funds has a large taxation component on rich employees, as well as on employees with shorter period of contributions. These latter employees may well be those who have low lifetime incomes and have difficulty in making ends meet during retirement. Therefore, the social pooling discourages contribution to pension funds by the rich, and does not necessarily help the poor retirees. In addition, since the social pooling was designed (at

least partly) to collect funds to pay pension debts of the old PAYGO scheme, it also imposes taxes to workers who earn average wages. In fact, the longer these workers contribute to the social pool, the higher the tax burden. In this sense, the social pooling should be completely abandoned and the pension scheme should become a fully funded one. As for the provision of a minimum pension to participants, the current UMLS program provides an adequate safety net for poor retirees.

The best approach to deal with the implicit pension debt of the old PAYGO system is for the government to recognise the debt in its budgetary planning, and explore the most efficient way of financing the costs over time. The question is: without using the social pooling to contribute to paying the pension debt, will the debt of the old PAYGO scheme be too high to pay back? In Chapter 7, some simple simulations are carried out to examine the tax burden of financing this pension debt over the 2001 and 2050 period. The results indicate that the payroll tax for financing the transition costs is very feasible. In the cases that are simulated, the payroll tax on urban workers during this period is not higher than 6%, when the discount rate is high and the economic growth rate is low, and that the tax system is assumed to be as inefficient as it was in 2000[7]. If the taxation system becomes more efficient over time[8], or the economy grows faster and/or the discount rate is lower, the tax rate required is even lower. For example, when the urban economy (GDP per capita) grows at 4.5% per year, the wage elasticity of labour supply is 1, the discount rate is 5%/year, and the taxation system is becoming more efficient, the payroll tax rate required to finance the pension debt rises from as low as 2.4% in 2001 to 2.5% in 2050. The simulation results also suggest that to improve the economic efficiency, the government should consider levying less tax when the taxation system is inefficient, and increase the tax when it becomes more efficient.

Finally, within the current pension scheme, the most urgent reform needed is to strengthen rules of the ownership and management of individual accounts. This is crucial for the successful transform into a funded pension scheme, and to obtain the full potential benefits of such a scheme.

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[6] This scenario can become reality when the PAYGO scheme covers only part of urban employees. As a result, young employees have the incentive to escape from the scheme to avoid paying pensions to retirees (See Chapter 4).

[7] Following the definition as explained in Chapter 6, this means that only 92.5% of tax revenues is used to pay the pension debt.

The analysis in Chapter 7 shows that when labour supply is exogenous, a fully funded pension scheme by using individual accounts to accumulate compulsory pension savings may or may not have any impact on private saving decisions (See Table 7-1). Further discussions argue that the ownership and the return on funds in the individual accounts are factors that affect the efficiency impact of pension contributions. In the current pension scheme, regulations to clarify and protect employees' ownership of their individual accounts need to be improved. Information on employer contributions, the amount of funds and the performance of the funds should be easily accessed by employees. Policies to ensure that the accounts are fully portable, both within the social pooling area (the province) and between areas need to be made and implemented. Equally important is the improvement of the management of funds in individual accounts. The key criterion of good management of the funds is that funds are safe, and earn the market return. To achieve this goal, fund management should be separated from the government department, who also makes decisions on how the fund should be managed. Funds should be given to independent fund managers, who have professional knowledge of long-term investment. Prudential regulations are essential to supervise the performance of these managers to ensure that they behave on behalf of the fund owners? the employees.

Well-defined and protected ownership of individual accounts and professionally managed funds with adequate prudential supervisions will reduce the perceived tax component of pension contributions. This generates a public pension scheme that has the minium disincentive impact on individual employees. In addition, from the government's point of view, well-defined ownership and independent management of individual accounts reduces the need for the government to provide pensions. The government's role can then be limited to making rules, supervising fund managers, and the provision of a safety net for the poorest pensioners. In the long run, the risk of running into a large budgetary deficit due to bad fund management by government agencies is therefore limited. Of course, if the government stands by to bail out failed fund managers, it is still possible that public money will be used to pay pensions. This will increase tax burden on the economy.

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[8] This is assumed to be the case that the % of tax revenues that is 'wasted' declines at the same rate as the growth rate of GDP per capita. See Chapter 7 for details.

These policy implications are for the future reforms of the pension scheme in China. It is expected that this study more studies will contribute to the research that explores reform options of social security programs in China, especially from the viewpoint of establishing an economically efficient and socially adequate social security system for all Chinese people.

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